DOCUMENT RESUME

ED 201 792 CE 028 775

AUTHOR	Ruff, Richard; And Others
TITLE	Vocational Education: A Look into the Future. Research and Development No. 207.
INSTITUTION	Ohio State Univ., Columbus. National Center for Research in Vocational Education.
SPONS AGENCY	Office of Vocational and Adult Education (ED), Washington, D.C.
BUREAU NO	498MH00014
PUB DATE	Jan 81
CONTRACT	300-78-0032
NOTE	83p.; For related documents see ED 189 370 and ED 195 825.
AVAILABLE FROM	The National Center for Research in Vocational Education, National Center Publications Office, Box F, The Ohio State University, 1960 Kenny Rd., Columbus, OH 43210 (RD 207, $5.50; discounts available for quantity orders).
EDRS PRICE	MF01/PC04 Plus Postage.
DESCRIPTORS	Educational Needs; *Educational Planning; Federal Regulation; *Futures (of Society); *Long Range Planning; *Models; Needs; Planning; *Policy Formation; Postsecondary Education; Secondary Education; Social Change; Trend Analysis; *Vocational Education

ABSTRACT

This study of possible futures for vocational education (the second year of a two-year study) is designed to be of help to those who have the responsibility to set directions for vocational education. It is an attempt to isolate and analyze the factors that are likely to influence the field in the 1980s and to suggest the kinds of decisions that might bring about desirable future events or conditions. By synthesizing the trends, events, and issues likely to influence vocational education in the 1980s, a standard world scenario for vocational education in 1990 and two alternative scenarios were created, using much of the data from work conducted during the first year of the project. During this second year, two main activities were carried out: a cross-impact study was conducted, and three scenarios were developed. The cross-impact analysis attempted to estimate the effect of a given event, trend, or federal policy initiative upon federal vocational education policy initiatives. Data generated by the cross-impact study, as well as year-one data, were used to create the standard world scenario and its two variations. In general, the scenarios indicate that vocational education in this decade will probably become a more diverse enterprise with regard to the characteristics of its clients, the kinds of services it delivers, and the methods it employs to deliver its services. (KC)

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ED201792

Research and Development No. 207

VOCATIONAL EDUCATION: A LOOK INTO THE FUTURE

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January 1981

CE 098 775

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FUNDING INFORMATION

Project Title:	Possible Futures for Vocational Education
Contract Number:	300-78-0032
Project Number:	498MH00014
Educational Act Under Which the Funds Were Administered:	Vocational Education Amendments of 1976 P.L. 94-482
Contractor:	The National Center for Research in Vocational Education The Ohio State University Columbus, Ohio 43210
Executive Director:	Robert E. Taylor
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TABLE OF CONTENTS

	Page
TABLES AND LISTINGS	v
FOREWORD	vii
EXECUTIVE SUMMARY	ix
CHAPTER I – INTRODUCTION	1
CHAPTER II – FUTURES METHODOLOGIES	3
CHAPTER III – HISTORY AND BACKGROUND	11
CHAPTER IV – METHODOLOGY	23
CHAPTER V – RESULTS OF THE CROSS-IMPACT ANALYSIS	29
CHAPTER VI – SCENARIOS	41
APPENDICES	
Appendix A – Holistic Cross-Impact Format	61
Appendix B – Cross-Impact Quantitative Matrix	65
Appendix C – Consultants Who Helped Generate Two Alternative Scenarios	69
Appendix D – Cross-Impact Participants	73
BIBLIOGRAPHY	77

TABLES AND LISTINGS

		Page
Table		
3.1	Highlights of the Delphi Results	13
3.2	Changes in the Environment Facing Vocational Education	15
3.3	Policy Implications of Future Changes	18
5.1	Ratings of Probabilities of Occurrences	37
Listing		
5.1	The Effects of Trends and Policies Upon Special Needs Populations	30
5.2	The Effects of Trends and Policies Upon Accountability	31
5.3	The Effects of Trends and Policies Upon Sex Stereotyping	32
5.4	The Effects of Trends and Policies Upon Youth Unemployment	33
5.5	The Effects of Trends and Policies Upon Economic Development	34
5.6	The Effects of Trends and Policies Upon Conservation of Energy	35

FOREWORD

Anticipating the future is a vital activity of vocational educators who must plan for the continuation of programs and services. How will vocational education look in the 1980s? Is it possible to identify trends and to project key decision points of significance to those who may wish to influence future directions in the field?

To provide some answers to these questions, the National Center, under contract to the U.S. Department of Education, Office of Vocational and Adult Education, has been conducting a study to determine the factors likely to be most important to vocational education in the 1980s.

This report summarizes the results of the second year of this ongoing study; in particular, it provides an examination of possible alternative futures for vocational education.

Because vocational education permeates so many of our institutions, a wide variety of individuals were consulted for their perspectives on possible vocational education futures. Twenty-four individuals from a range of disciplines participated in a cross-impact analysis for this study. Their assistance is greatly appreciated. For their excellent contributions solicited during various phases of this work, we also wish to thank the following persons: Robert Borden, Massachusetts State Advisory Council on Vocational Education; Nancy Evans, Ohio Department of Education; Ron McCage, V-TECS; Dewey Oakley, Virginia Department of Education; Les Snyder, Arizona State University; Michael Sugarman, University of Akron; Hollie Thomas, Florida State University; and Gary Wooddell, Miami University.

National Center staff members responsible for the design, execution, and preparation of this report were Jill Frymier Russell, Bruce Shylo, and Richard Ruff, project director. Additional valuable support was provided by Kathie Medley and Rusty Grohoske, typists; by Nancy Stephens Puleo, program assistant; and by Janet Kiplinger, editor.

The quality of the final product was enhanced through the recommendations of two reviewers, who included: Don Glines, California Department of Education; and Catharine Warmbrod, of the National Center.

Robert E. Taylor
Executive Director
The National Center for Research
in Vocational Education

EXECUTIVE SUMMARY

This study of possible futures for vocational education is designed to be of help to those who have the responsibility to set directions for vocational education. It is an attempt to isolate and analyze the factors that are likely to influence the field in the 1980s and to suggest the kinds of decisions that might bring about desirable future events or conditions. An underlying premise throughout the report is that the future can be influenced; that decisions made today can shape what will be tomorrow.

By synthesizing the trends, events, and issues likely to influence vocational education in the 1980s, a standard world scenario for vocational education in 1990 and two alternative scenarios were created. Much of the data used in constructing the scenarios resulted from work conducted during the first year of the project.

During this second year, two main activities were carried out: a cross-impact study was conducted, and three scenarios were developed. The cross-impact analysis attempted to estimate the effect of a given event, trend, or federal policy initiative upon federal vocational education policy initiatives. Cross-impact analysis participants were nationally recognized individuals who were knowledgeable about overall vocational education policy, vocational education program areas, or relevant societal trends. Data generated by the cross-impact study, as well as year one data, were used to create the standard world scenario. A panel of consultants helped to construct two alternative scenarios by identifying changes in the standard world which might result from the introduction of a modifying policy variable.

The scenarios in this study portray probable alternative futures. The worth of these or any scenarios rests in allowing planners to see the pathways through which a system can be changed to achieve desired goals. In general, the scenarios indicate that vocational education will probably become a more diverse enterprise with regard to the characteristics of its clients, the kinds of services it delivers, and the methods it employs to deliver its services. Some of the more specific features of the standard world scenario are as follows:

- A strong federal emphasis on meeting the needs of special populations will continue, and a portion of federal vocational education funds will continue to be targeted toward special groups.
- Vocational education enrollments will reflect a higher proportion of minority students due to increases in the relative number of minorities among the younger age groups.
- More vocational education students will be educationally disadvantaged, indicating a need to place increased emphasis on basic education and work skills.
- Fiscally conservative federal and state governments will cause keen competition for scarce resources among special needs groups.
- More cooperative arrangements between vocational education and business, industry, labor, and other public agencies will result as adequate incentives to cooperate are offered, and as benefits to be derived from cooperation are perceived.

- No major new accountability legislation will be enacted, but accountability will remain high. Vocational education deliverers will be required to demonstrate that local occupational supply and demand data are used to design and offer appropriate vocational programs. Although job and educational placement will continue to be important evaluative criteria, they will not be the sole criteria for evaluating the effectiveness of vocational education programs.
- Although vocational education will be available to individuals regardless of their sex, stereotyping and bias will not be totally eliminated. Despite the attempts of employers to eliminate sex discrimination, vocational education students will continue to encounter a degree of sex bias and stereotyping at the worksite.
- While vocational educators will employ numerous strategies in their efforts to reduce youth unemployment, strong outside forces will blunt the impact of those efforts. Where labor shortages exist, however, the efforts of vocational education to reduce youth unemployment will prove to be particularly effective.
- Vocational education will assume more responsibility as an actor in economic development and will become increasingly involved in retraining workers, in ensuring an adequately trained work force, and in meeting labor needs of new businesses and industries.
- The role of vocational education in the conservation of energy will be defined as business and industry recognize the economic necessity of energy conservation; more vocational education programs will incorporate energy consciousness, and workers will be trained in conservation techniques.
- Equipment deterioration and obsolescence, coupled with high replacement costs, will encourage vocational educators to seek novel approaches for providing up-to-date training, resulting in more cooperative arrangements with employers and in increased delivery of training at the worksite.
- Vocational administrators will have to function in multiple roles as financial constraints lead to practical limitations on the use of subject matter specialists.
- Training and retraining of vocational education teachers to keep pace with technological changes will become a major issue.

All of these possible developments, as well as many others, are discussed in fuller detail in this report.

CHAPTER 1

INTRODUCTION

Vocational education will probably experience significant changes during the 1980s. In fact, its satisfactory growth may require significant variations from current practice. The decade of the eighties will be a challenging transformation period. The issues which must be addressed when determining future directions of vocational education will be varied and complex. Headline topics such as unemployment and the productivity of American industry will affect vocational education. The adaptability and responsiveness of vocational educators depend upon increased awareness and knowledge of two broad areas:

1. The social and educational context within which vocational education exists
2. The consequences of the decisions and policies that determine vocational education practices and outcomes

If vocational education is to achieve its potential, then vocational planning must have a futures orientation. The National Center for Research in Vocational Education was charged through the Education Amendments of 1976 to provide information useful to the federal government for planning and making policies for vocational education. A futures orientation has been incorporated into the National Center's scope of work to meet this charge. A futures research effort was initiated in 1979 and continues on an annual project basis.

Purpose of This Report

The purpose of this report is to present the findings from the National Center's futures research effort. The trends, events, and issues facing vocational education in the 1980s were identified in the first year of the study. These findings are highlighted in chapter 3. Year one findings are reported in detail in the document entitled, *Trends, Events and Issues Likely to Influence Vocational Education in the 1980s* (Lewis and Russell 1980).

In the second year of the futures research effort, the effects that the earlier identified trends, events, and issues might have upon each other have been analyzed. The analysis assumes that an event or trend does not occur in isolation, but may affect the occurrence or nonoccurrence of other events. These possible interactions have been "played out", and the resulting potential futures are presented in scenario format in chapter 6. The scenarios should enable vocational education policy makers to see critical decision points and to envision possible outcomes.

Overview of the Report

This report was developed for readers with varying degrees of familiarity with the field of futures research. For those individuals who may not be as familiar with futures research, chapter 2 is a general introduction to some of the more common futures research methods. Readers who feel that they are

adequately knowledgeable about futures methodology may wish to start their review of the report with chapter 3.

Chapter 3 summarizes the results from the first project year which served as the basis for the second year work. The processes used to carry out the second year activities are described in chapter 4. These processes included a cross-impact analysis and scenario generation. The results from the cross-impact analysis are presented in chapter 5 and the scenarios are presented in chapter 6.

The scenarios are the most important part of this report. They synthesize all of the previous research findings into a format which is highly readable. Some readers may wish to focus primarily upon the scenarios that are presented in chapter 6.

CHAPTER 2

FUTURES METHODOLOGIES

Futures research is a new field and, consequently, is often misunderstood. To many persons, the idea of studying the future borders on the impossible. Such a venture implies studying something that does not exist or, at best, something that is vague and unclear. Although it would be unwise to ignore the difficulties inherent in futures research, certain techniques and devices exist that can provide a framework for the study of future events or developments.

Futures research, although a young endeavor, has a great deal to offer planners. Given its focus on thoughtful, systematic explorations of the future, this new field offers utility in planning and policymaking. The merit of futures research rests largely on the aid it can lend decision makers. Just as meteorologists forecast weather and demographers make forecasts of population growth, so too do futures researchers strive to look ahead in time and arrive at thoughtful judgments about preferred courses of action. If planners are to be among the social architects of the future, their success will largely be determined by their ability to define and construct the future.

Webster's New Collegiate Dictionary defines forecasting as calculating or predicting "some future event or condition usually as a result of rational study and analysis of available pertinent data." The literature in futures research tends to avoid the term "prediction" as it connotes a greater degree of precision and certainty than does forecast. In examining different futures methodologies, one should remember that the ultimate objective of the technique is to forecast some future state of events. Such forecasts can then be incorporated into an agency, organization, or institutional planning process.

According to Martino (1979), most forecasters use the same basic approach. They attempt to identify patterns of behavior and employ these patterns to anticipate future behavior. This approach can be used whether one is forecasting trends in economy, weather, technology, or society. The success of any forecaster depends upon the extent to which reliable patterns exist in the field, the extent to which the forecaster knows these patterns, and the extent to which the forecaster has access to the data required to generate a forecast. The forecaster's ability to make accurate predictions is due less to the methodology chosen to make the forecast, than it is on the state of knowledge in the field and the availability of data.

Futures Research As Science

By definition, the future is largely unknowable, and therefore can be examined only in the most circumspect and indirect methods. The familiar tools of scientific investigation can be applied only in their most primitive forms (Amara 1978).

Nevertheless, forecasters are in much the same position as experimental scientists. It might be argued that even in the physical sciences, where replication of an experiment can be expected to

consistently yield the same results, one can only approach "proof" in a conditional sense. There is no guarantee that some day a perfectly controlled experiment will not give unexpected results.

Social forecasters are in a similar position. They base their forecasts on patterns derived from past experiences, and assume those patterns will continue. As long as the forecasts work, the social scientist is as justified as the experimental scientist in assuming that observed patterns will repeat themselves (Martino 1979).

Unlike physical scientists, however, social scientists must conduct their experiments in a natural environment. The control which characterizes experiments in the physical sciences is impossible to achieve in social science research, particularly in futures research. It is also true that social and cultural phenomena are more complex than physical phenomena and, therefore, more difficult to categorize and analyze. When their identification and reporting must be deduced from the historical perceptions of others, the specificity called for in the scientific method may be lost. Too, forecasters will have fewer cases and less data from which to generalize than their scientific counterparts. In that respect the work will be weaker and less certain. Applying scientific methods to futures research, however, encourages forecasters to rigorously examine their assumptions and to modify them in order to make the techniques work.

Even if futurists were to use impeccable methods, knowledge of the future would remain elusive. Witness the self-fulfilling prophecy of a predicted bank failure which leads to a run on the bank and causes its failure. Long-range plans derived from present-day values may be offensive to the people who have to live with them, through no fault of the initial forecasting and planning effort (Fowles 1978). Fraught as it is with pitfalls and cautions, futures research nevertheless offers much promise for planners and decision makers.

Current approaches to forecasting fall into three general, overlapping categories. The first, the descriptive approach, employs conjecture, speculation, and imagination. The classic visionary and utopian futures such as Orwell's *1984*, Huxley's *Brave New World,* and the works of H.G. Wells and Jules Verne characterize the descriptive approach.

The two forecasting approaches most often used are exploratory forecasting and normative or predictive forecasting. Exploratory forecasting methods start from the present and its preceding history and attempt to project future developments. This approach relies upon extrapolating past and present developments into the future, and in its simplest sense yields what might be termed the logical or no-surprise future. Conversely, normative forecasts start with some desired future and work backwards to derive feasible routes for the transition from the present to this desired future (Martino 1979). In a normative or prescriptive forecast, value assumptions and choices are made about how a specific future may be viewed or attained. Although it might appear that exploratory and normative forecasts stand in opposition to one another, such is not the case. In practice, when people make a normative forecast they usually have an intuitive exploratory forecast in mind as they consider the attainability of the desired future. Likewise, an exploratory forecast is made with at least some sense as to whether the future which is revealed is desirable or not. Clearly, the two approaches are not exclusive and should be integrated.

Exploratory Forecasting Methods

Trend Extrapolation

All exploratory forecasting methods are based on one or another form of extrapolation. Extending a trend line is probably the easiest method of trend extrapolation. Consequently, forecasting by the projection of trends has been a frequent mode of investigating the future. Trend extrapolation is appealing because most of our day-to-day activities are based on anticipated regularities and constants in our lives. It is easy, therefore, to take for granted the continuance of many trends that structure the nature of our lives. Because the rationale underlying trend extrapolation is so similar to the rationale behind our day-to-day activities, trend extrapolation is probably the least complex, most intuitively straightforward forecasting tool to comprehend. It is a natural adaptation of normal cognition processes (Hill 1978).

Data on some phenomenon measured repeatedly over a period of time is required to analyze trends. In projecting the population to the year 1990, it is necessary to have census data from many years previous to the present date. In this fashion, past trends can be captured and identified and future trends forecasted. Identifying factors that influence trends and incorporating relevant findings into the trend extrapolation can increase accuracy. It is usually necessary to identify upper and lower limits to a trend in order to keep the extrapolation plausible.

Some purely extrapolative methods commonly used are growth curves and trend curves. These methods are used when neither the elements affecting change in the subject area nor the interactions among those elements are known, but it can be assumed that the elements will continue to interact in their historical pattern. The forecast is derived by extrapolating the historical pattern.

Other extrapolative techniques are useful when the forecaster has some knowledge of the factors affecting change and the interactions among those factors. Two of the more common methods are precursors, which warn of impending change, and correlation methods. A precursor is analagous to a drop in temperature and barometric pressure predicting an impending storm. In many areas, changes in the subject of interest are preceded by warnings of some kind. If precursors can be identified as having some regular relationship with the subject of interest, they can be very useful in forecasting. An example is that rising unemployment rates might foreshadow an increase in crime.

Correlation methods make use of observed relationships between the topic to be forecasted and some other factor which can be more directly forecasted or measured (Martino 1979). An excellent example is the correlation between births and school enrollments. Infant births foreshadow school enrollments. Although the correlation seems obvious today, the overbuilding of public schools, colleges, and universities in the 1960s was attributable, in part, to ignoring such a relationship.

Limitations of trend extrapolation as a research tool are related to reliability and validity of the data base. If historical data have not been collected for a long enough period of time, or if the data acquisition and recording varied over time or from place to place, the data may not be parallel; thus the investigator may be trapped into comparing apples and oranges.

The reliability of trend extrapolation also involves technical competency. Adjusting the curve or line to some preconceived notion can cause difficulties as can suggesting correlations where none actually exist. Investigator bias can seriously threaten this method's reliability.

The issue of validity arises when the variables used to measure the subject of interest are not universally agreed upon. For instance, forecasting the quality of life in 1990 presupposes some definition of quality of life. Since this is a highly personal and variable issue, different observers will accept or reject different subsets among the candidate variables (Mitchell 1975). Even though the data may be accurate and standardized and the extrapolation method used with great care, the findings may not be valid.

Trend extrapolation used alone will not significantly advance rigorous forecasting and causal analysis. If it is done properly, with recognition and acceptance of its limits, trend extrapolation has much to offer as a vehicle for exploring and refining problems and defining boundaries of an issue.

Cross-Impact Methods

The exploratory forecasting methods discussed thus far are generally used to forecast single subject areas. That is, events and trends are projected one by one, without reference to their possible influence on each other. One technique that can be used to combine separate forecasts and to capture their interactions is known as cross-impact analysis. It is not a forecasting method per se, but is used in examining the consistency of sets of independently generated forecasts. Cross-impact analysis has been defined as a systematic means of studying the interactions among events or developments. The analysis evaluates changes in likelihood of occurrence among an entire set of possible future events in light of limited changes in probability for some of the events in that set (Ezner, Boucher, Lazar 1971).

As a technique, cross-impact analysis can easily be applied to a wide variety of problems. It can be modified to meet the demands of the situation. An investigator can design and conduct a cross-impact analysis to make individuals sensitive to the kinds of interactions that might occur among given variables, or sophisticated, mathematical computer-assisted models can be employed. The technique fits many situations and purposes, and varies in complexity.

Constructing cross-impact matrices helps those wishing to check the consistency of individual forecasts or the interactions among them. For instance, a forecast condition of rapid economic growth would not be consistent with high levels of unemployment and decreasing incomes. Cross-impact matrices are useful in identifying key events which are likely to be important to the future and how these events are likely to interact. Identifying such key events can be helpful to decision makers in policy formulation. The utility of cross-impact analysis is entirely dependent upon identifying the relevant events which affect one another, and on the correctness of the statements of interactions among the individual forecasts.

Intuitively, participants in brainstorming sessions, scenario writing, pattern recognition, and Delphi forecasting (other forecasting methods) make use of cross-impact analysis, although sometimes unsystematically. Imagination is critical to the process, and the greater the number of interactions involved, the more computer assistance is necessary. The cost, therefore, can range from minimal to extremely high. Users of cross-impact techniques must keep in mind that the results are only likely and not absolutely certain to occur.

Scenarios

A scenario is an outline of one conceivable state of affairs, given certain assumptions about the present and the course of events in the intervening period. The scenario is a story that describes how

the world, a country, or some aspects of a culture might look at a distant point in time. A scenario supplies substance to trends that have been identified by forecasting methods. By providing decision makers with a picture of those aspects of the future which seem important and by presenting alternative "contexts" for decision making, scenarios encourage flexible and adaptive planning. Ultimately, the worth of any scenario rests not in whether it predicts right answers but in allowing planners to see the pathways through which the system can be changed to achieve desired goals.

There are numerous types of scenarios. A "surprise-free" scenario assumes that whatever is not changing today will remain stable in the future, and that whatever is changing now will go on changing at the current pace and in the same direction. A surprise-free scenario also presumes that no earth-shattering events or occurrences which would render the future unrecognizable from the past or present will occur. If the present projected into the future may with equal plausibility develop in two or more different directions, each can be explored separately. This is what is known as exploring "canonical variations" on the surprise-free future (Mitchell 1975).

Other types of scenarios include the "best case" scenario in which only favorable events occur, or the "worst case" scenario, in which everything goes wrong. Whatever type is chosen, scenarios are useful in presenting information and the consequences of various possible combinations of events.

Scenario writing has been described as an art form requiring a high degree of imagination rather than as a science. Effective scenarios must break conventional mind sets and consider events in new and novel ways. It is no coincidence that some of the best scenarios have been written by novelists, such as Jules Verne and H.G. Wells, rather than by scientists. To be useful, however, scenarios need to be credible, so it is important to be knowledgeable in the area about which is being written.

A possible scenario development process follows. Though the process may vary, it essentially consists of six steps:

1. Defining the system of interest in operational terms
2. Establishing a time period for the system to operate
3. Identifying external constraints of the environment on the system
4. Stating the elements within the system that are likely to increase or decrease the chances of the system meeting its goals and objectives
5. Stating the likelihood of occurrence of the elements identified in Step 4 in probabilistic terms
6. Reality testing the scenario (Allen 1978).

In summary, scenarios are useful in helping planners identify key decision points for policy formulation purposes. They are not to be taken as predictions of the future. Their greatest importance rests in portraying, often in vivid and graphic language, the cumulative impact of an entire set of events. The value of a future scenario is not so much in predicting what will be in twenty or thirty years, but in identifying key decision points where leverage may be applied in hopes of altering the future toward a more desirable state.

Simulation Models

Mathematical simulation modeling has become one of the most influential and promising techniques for forecasting. Simulation models, sometimes called causal models, attempt to reproduce the behavior of the system being modeled. A simulation model is a mathematical representation of a

system from which the behavior of the system can be inferred over time (McClean 1978). Because they are usually computerized and can manipulate data and perform high-speed calculations, simulation models offer the promise of helping to integrate complex social, economic, and technical systems. Simulation models can provide an explicit framework for thinking about the future of a particular aspect of the real world.

The development of a simulation model implies that all the important factors influencing change, and all the important interactions among these factors, are known. The model presents a statement of these factors and their interactions, and is presumed to represent the portion of the universe being modeled (Martino 1979). The danger of computer simulation models as a technique is that a tendency develops to rely upon a single model and its data set as the correct model. Forecasting via computer simulations will be more effective if it is based on the evaluation of many alternative models and sets of data.

Normative Forecasting Methods

As already mentioned, the major purposes of normative forecasting are first to identify preferred futures, and second to determine how to reach such futures. By identifying future needs and goals, the forecaster works back to the present situation. Two common methods of normative forecasting are relevance trees and morphological models.

Relevance Trees

Writing in *Futurism in Education,* McGrath (1974) likens a relevance tree to a pathway for the future. A desirable goal may be reached by directing a sequence of events along a pathway to the future. Alternative pathways for attaining predetermined goals are also identified.

When a relevance tree is constructed, some situation is subdivided into progressively finer units, each included in or related to the units above it and containing the units below it. A schematic drawing of a relevance tree might break a system into its major elements. Each element would be depicted as a branch, with all branches mutually exclusive of each other. A branch might represent a given problem with higher branches representing activities to solve the problem. Generally, the lowest-level branches represent possible alternatives for each of the major elements of the system that were described. Each alternative can be traced to the top of the tree to see why it is important and what the consequences of implementing or not implementing an alternative might be. By identifying a problem and a set of alternatives from the tree, a normative forecast might be made (Martino 1979).

Some common applications of a relevance tree-like methodology include Program Evaluation and Review Technique (PERT) and Planning-Programming-Budgeting System (PPBS).

Morphological Analysis

Morphological analysis is similar to relevance tree methodology. The major difference is that the morphological model is nonhierarchical in nature. It has been defined as "any technique which seeks to identify all possible means of achieving a given end. One approach is to create a list of all possible variables so that each can be examined and combinations explored" (Didsbury 1979, p. 176). Its utility lies more in identifying all the possible relationships among objects of consideration than in assigning value to those relationships.

To construct a morphological model, a forecaster must identify the major elements of a situation, elements that may involve several alternatives. By selecting one alternative from each of the major elements, a single representation of the situation can be synthesized. When the alternatives in every possible combination are aligned, all possible relationships can be identified. By eliminating impossible combinations and applying criteria of desirability and feasibility to the remainder, the investigator can arrive at a normative forecast.

To illustrate the above, consider the delivery of vocational education services, which can be divided into the following elements: services, delivery systems, and techniques. Within each element would be alternatives for that element. A table might resemble the following:

Services

A. Occupational Courses
    1. New and emerging occupations
    2. Traditional service area occupations
B. Counseling
    1. Personal
    2. Career
C. Placement
    1. Jobs
    2. Educational

Delivery Systems

A. Employer-based
B. In-school
C. Community-based

Techniques

A. Computer-assisted
B. Teacher-centered
C. Individualized
D. Independent study

Conceivably, such a table would reveal 2x2x2x3x4 = 96 vocational education service delivery models. Although this is a very crude example, it dramatizes the utility of morphological models in identifying alternatives.

Other Methods

Delphi Technique

"The Delphi Technique is a carefully designed program of sequential individual interrogations (usually best conducted by questionnaire) interspersed with information and opinion feedback. Delphi . . . operates on the principle that several heads are better than one in making subjective conjectures about the future, and that experts will make conjectures based upon rational judgment and shared information rather than merely guessing, and will separate hope from likelihood in the process" (Helmer 1967, p. 7-36). In the early 1950s, Olaf Helmer and his colleagues at the Rand Corporation developed the Delphi Technique. Helmer describes the procedure as a method of choosing among alternative policies that affect the future.

In its simplest form, a Delphi questionnaire is administered to a panel of experts in a particular field who are asked to respond individually to the instrument and to make independent judgments about the assigned topic. In this first round, the participants make their initial projections on a numerical scale. The median responses are calculated and returned to the participants who make a second estimate. At this time, participants are also requested to submit the rationale for their response, if it is very different from the median. The medians from the second round are calculated and are returned to the participants along with a summary of reasons for estimates which vary from the median. In the third and final round, respondents once again submit their projections. The exercise is repetitive; opinion formation through polling, aggregation, and feedback continues until consensus, defined as the median of the responses of the final round, develops (Weatherman 1974).

Success in using the Delphi technique is dependent upon panel selection. Although it is far from a simple task, experts in the relevant field must be invited to participate. Since their responses will be largely intuitive, their base of knowledge is extremely important. The fact that Delphi ensures the anonymity of panel members prevents them from being influenced by the personality or perceived authority of any other panelist. The process of receiving continuous feedback assists panelists in arriving at carefully considered responses and in reaching consensus.

Delphi studies have been modified and used for a number of purposes in futures research. Perhaps the greatest utility of the device is that it forces people to think. Other uses include predicting alternative futures (in addition to those indicated by current trends), identifying expected societal and technological innovations, and estimating the probability and time of occurrence of possible alternatives. Delphi studies have proved useful in providing information to assist in the selection of strategies best suited to meet a given set of objectives (Weatherman and Swenson 1974).

As a futures research technique, Delphi seems to be fairly credible and is used frequently. Like most futures methodologies, however, it can be criticized for some of its procedures. Although Delphi has achieved some amazing successes, it provides no more than "opinion" on the future. Interpretation of Delphi results must not assume that the experts who comprise the panel possess all the answers, are representative of all "experts", or are equally committed to the study. Delphi, as with most other futures methodologies, must be used with an awareness of its limitations.

Conclusion

Since the 1960s, many new processes and steps have been developed that planners and decision makers can use when attempting to probe the future. In preparing their *Handbook of Forecasting Techniques* for the Army Corps of Engineers, the Stanford Research Institute identified 150 forecasting approaches. They ranged from the more common, such as brainstorming and public opinion polls, to the very sophisticated macroeconomic models and Monte Carlo techniques. Many techniques possess similarities, but some are unique and hold special advantages or limitations. The purpose of this chapter was neither to identify all or even the "best" futures methodologies, nor to impart the skills necessary to use them. Its purpose was to give the reader a working knowledge of some of the more frequently employed methods. Although by no means foolproof, futures methodology has a great deal to offer in identifying preferred futures and in helping society attain them.

CHAPTER 3

HISTORY AND BACKGROUND

This chapter presents a summary of the methodology and findings from the first year of futures research at the National Center. For a more complete description, the reader is referred to the original text of *Trends, Issues, and Events Likely to Influence Vocational Education* (Lewis and Russell 1980).

The initial year of the futures effort was devoted to identifying the trends, events, and issues likely to affect vocational education in the 1980s. That is, what are those factors which will probably shape vocational education throughout the coming decade? To answer this question, three processes were employed. The first was the design and implementation of a Delphi to assess consensus of leaders in the field about their expectations for the future. The second involved contracting with the Institute for the Future for an examination of changes in the environment that may affect vocational education. The third process was a conference in which experts interpreted alternative futures and identified crucial policy issues.

Delphi Analysis

Delphi is a futures forecasting technique based upon bringing together the opinions concerning the future held by knowledgeable individuals in a given field. The Delphi is a "carefully designed program of sequential interrogations (usually best conducted by questionnaire) interspersed with information and opinion feedback" (Helmer 1967, p. 7-36).

A specially created instrument was used for the National Center's Delphi. It elicited five projections concerning *if* an event might occur, *when* the event might occur, the *desirability* of the event, the potential *impact* of the event, and the power of vocational educators to *influence* the event. The thirty-six events which made up the Delphi were specific occurrences or phenomena that could happen. They were created to reflect the following areas of concern to vocational education:

1. Access
2. Special populations
3. Youth unemployment
4. Finance
5. Planning and evaluation
6. Federal role
7. Education and work
8. Coordination with other vocational education deliverers
9. Sex stereotyping
10. Lifelong learning
11. Programming

Thirty-nine persons completed all of the Delphi activities. They represented the following areas of vocational education:

1. Administration of state vocational education programs
2. Professional development or teacher education within vocational education
3. Research and development
4. Administration and policy making

Before the data from the respondents were analyzed, the group medians and interquartile ranges were calculated for each of the 180 variables (thirty-six events with five projections each). The medians were ranked, and a listing of those events which ranked high and low for each of the five projections is presented in table 3.1, "Highlights of the Delphi Results."

Institute for the Future
Contextual Analysis

The Institute for the Future (Menlo Park, CA) undertook an analysis of the future of vocational education which focused upon the areas of demography, labor force, economy, societal expectations, and education. The analysis was accomplished primarily through trend extrapolation which assumes "a tendency for the values in a time series to increase with some steady regularity" (Hill 1978, p. 249). The result of the Institute for the Future's analysis was a document entitled, "Policy Choices for Vocational Education."

In the report the changes in the environment likely to influence vocational education were identified. These changes are summarized in table 3.2 and are presented in detail in the following paragraphs.

Demography

- Between 1977 and 1985 the relative number of young people between the ages of sixteen and twenty-four will drop sharply.
- At the same time, there will be a rise in relative share of the population in several other age categories, notably those aged thirty-five through forty-four and those sixty-five and over.
- The relative number of minorities among the younger age groups will be increasing, especially if Hispanics are considered as a minority. The illegal alien population, which will number about ten million people in the early 1990s, is primarily young and Hispanic.
- The relative number of single-parent families will rise. Because of their increase and because of the growing number of households that depend on two wage earners, the number of children with a mother in the labor force will rise to almost 60 percent.

The Labor Force

- Fewer young workers will enter the labor force as the population between the ages of sixteen and twenty-four declines.
- Questions of skill capabilities of young labor force entrants may arise as overall achievement scores decline and as a larger portion of labor force entrants come from disadvantaged population groups.

TABLE 3.1

HIGHLIGHTS OF THE DELPHI RESULTS

Events Which Ranked High on the Probability of Occurrence Projection

- Schools enter into cooperative agreements with business, industry, and labor.
- Vocational education is primarily competency-based.
- Federal subsidies are available for training instructors of special needs students.
- Tax credits are available to employers for training of employees.
- Thirty percent of those over age sixty-five remain in the workforce.
- Postsecondary vocational education credit for technical courses is accepted for transfer by many four-year institutions.
- Federal funding for CETA and Job Corps increases by 25 percent.

Events Which Ranked Low on the Probability of Occurrence Projection

- Institutional training programs of CETA are transferred to the Department of Education.
- Completion of a two-year vocational education program is necessary to enter the primary labor market.
- Vocational education policymaking is highly decentralized.
- The number of apprenticeship positions nationally doubles.
- Seventy-five percent of secondary vocational education graduates go on immediately to postsecondary vocational education.

Events Which Ranked Low on the Probable Date Projection (likely to occur pre-1985)

- Federal subsidies are available for training instructors of special needs students.
- Federal funding for CETA and Job Corps increases by 25 percent.
- Federal funding for vocational education is tied to specific measurable criteria.
- Schools enter into cooperative agreements with business, industry, and labor.
- Many postsecondary vocational education programs are scheduled evenings and weekends.
- State and local dollars for vocational education increase by 25 percent.

Events Which Ranked High on the Probable Date Projection (likely to occur either later or never)

- Completion of a two-year vocational education program is necessary to enter the primary labor market.
- Thirty percent of all senior management positions in the labor force are held by minorities and women.

Events Which Ranked High on Desirability

- Schools enter into cooperative agreements with business, industry, and labor.
- Many employers will redesign work settings to match the abilities of special needs workers.
- The declining birth rate reduces the youth unemployment problem.
- Minimum competencies in vocational education are required for graduation in 25 percent of the states.
- Vocational education is primarily competency-based.

TABLE 3.1 (continued)

HIGHLIGHTS OF THE DELPHI RESULTS

Events Which Ranked Low on Desirability

- Productivity of the American worker declines to zero growth.
- Completion of a two-year vocational education program is necessary to enter the primary labor market.
- Fifty percent of federal funding for vocational education is targeted for special needs populations.

Events Which Ranked High on Potential Impact (upon the quality of vocational education)

- Schools enter into cooperative agreements with business, industry, and labor.
- Vocational education is primarily competency-based.
- More than 50 percent of federal funding is tied to training for changing and emerging occupations.
- Most students have access to vocational programs representing all career clusters.
- Minimum competencies in vocational education are required for graduation in 25 percent of the states.
- Secondary vocational education is exploratory in nature.

Events Which Ranked Low on Potential Impact (upon the quality of vocational education)

- Thirty percent of those over age sixty-five remain in the work force.
- Productivity of the American worker declines to zero growth.
- Thirty percent of all senior management positions in the labor force are held by minorities and women.

Events Which Ranked High on Vocational Educator's Power to Influence

- Vocational education is primarily competency-based.
- Most students have access to vocational programs representing all career clusters.
- Secondary vocational education is exploratory in nature.
- Instruction in energy conservation is 25 percent of course content in preparation for related fields.

Events Which Ranked Low on Vocational Educator's Power to Influence

- The declining birth rate reduces the youth unemployment problem.
- Thirty percent of those over age sixty-five remain in the labor force.
- Most married women work.
- Many employers redesign work settings to match the abilities of special needs workers.
- Productivity of the American worker declines to zero growth.

TABLE 3.2

CHANGES IN THE ENVIRONMENT FACING VOCATIONAL EDUCATION

Demography

The number of young people sixteen to twenty-four will drop by 1985, and the number of persons between thirty-five and forty-four and those sixty-five plus will increase. The proportion of minorities in the younger age groups will increase. The number of single-parent families will grow, and two-earner households will continue to increase in prevalence.

The Labor Force

There will be fewer young labor force entrants. Those young persons who are trying to enter the labor market may be less skilled than those of previous years. Women will make up an increasing proportion of the labor force. There will be more part-time workers.

The Economy

Businesses will be forced to make more effective use of capital as the labor force growth rates decline. Employers will have more difficulty recruiting skilled workers. The cost of specialized vocational programs will rise, and those that train for a particular occupation will be perceived as most cost-effective. The number of households earning over $25,000 (constant dollars) will increase. Businesses may spend more on benefits like education.

Societal Expectations

Less public money will be available for vocational education. Workers dissatisfied with work roles will demand increasing benefits. Employers will become more flexible regarding where and when work is completed and how work is organized.

Education

College attendance of the traditional student (age twenty to twenty-four, full-time) will decline. Colleges will seek to recruit older, part-time students, minority students, and inner-city students. Schools may need to coordinate and cooperate with local business/industry. Public satisfaction with education could have a large impact on fund availability. The armed forces will provide a large proportion of postsecondary training.

- Women will make up an increasing proportion of the work force. A larger share of this group will be made up of older women reentering the labor force.
- There will be a further shift toward part-time work as more members of two wage earner households opt for greater job flexibility.

The Economy

- As labor force growth rates decline, business will become more dependent upon effective use of capital. This implies more capital used per employee, better trained employees, and possibly more in-house training.
- Employers will have a harder time recruiting skilled workers and are likely to look at relatively untapped groups for new employees: older persons, women who have been out of the work force, the handicapped, part-time workers, and so forth.
- Increasing inflation implies that the cost of specialized vocational programs will rise rapidly. Specialized vocational programs that do not tie directly into a particular occupational need may run into economic difficulties.
- Anticipated real growth rates of almost 3 percent a year imply the spread of affluence. The number of households earning over $25,000 in constant dollars will double by the 1990s (most of the increase will be in young, two wage earner households). More money will be available for specialized education.
- Businesses taking advantage of growing affluence may be in a better position to spend money on employee benefits, such as education and retraining.

Societal Expectations

- Given the growing force of fiscal conservatism, less public money will be available for vocational education. It is likely that total public funds spent on vocational education will rise at a slower rate than the growth in nominal GNP.
- Increased dissatisfaction at work will spur demands for extra benefits. Among these benefits are likely to be tuition aid and retraining programs.
- Employers will become much more flexible. We are likely to see more decentralization of responsibility at the work place, more autonomous work groups, and greater use of flexible working hours.

Education

- College attendance of the traditional student—the twenty to twenty-four year-old full-time attendee—will fall dramatically between now and 1995. This means that to retain enrollment levels, many colleges will seek to attract older, part-time students.
- Postsecondary education will have a greater concentration of older students in their thirties and forties interested in career or occupational change.
- With decreasing enrollments, postsecondary schools will be even more aggressive in going after students that have usually been underrepresented: blacks, Hispanics, residents of aging central cities and rural areas, and older students.

- Some postsecondary schools may find it advantageous to cooperate with local businesses to provide in-house training or to arrange educational contracts.
- Public satisfaction (or dissatisfaction) over the quality of education will be an important consideration in the 1980s and could have a dramatic impact on curriculum and public funding support.
- The armed forces will provide a larger portion of all postsecondary training.

In addition to these contextual changes, the Institute for the Future's report identified the following considerations and their implications for addressing the future of vocational education. The considerations and implications are summarized in table 3.3.

High Technology

The economic outlook calls for a substantial increase in investment in the 1980s and an increasing substitution of capital for labor. The decade could well be a boom period for new technologies: new computer applications, wide use of microprocessors, a transformation of office word-processing and communications, an expansion of health-care equipment, a whole new field of biotechnology, and so forth. The expansion of high technology will have the effects of upgrading many occupations, raising skill demands in formerly routine jobs or creating new, skilled positions. The implementation of new technologies will create a myriad of opportunities for vocational education programs at all levels, if program directors are sensitive to the pace and scale of shifts in employment opportunities.

Loss of Traditional Students

Secondary school enrollments in vocational education programs are sure to fall within the next decade, even if vocational programs maintain their relative share of secondary school enrollments. Postsecondary enrollments of students between the ages of eighteen and twenty-four are also likely to fall—particularly after 1985. This will have an especially large impact on the full-time student population of noncollegiate, postsecondary schools.

Rise in Importance of New Groups

While the number of the traditional, young adult, full-time, vocational education students will decline, there should be a sharp rise in new candidate populations. Most notable among these groups will be young adults who are thirty-five and older, especially women reentering the labor force, women currently holding part-time jobs, and both men and women seeking to upgrade their skills and make mid-career changes. Of all the vocational/occupational education providers, the two-year colleges seem best suited to meet the needs of this group. The two-year colleges have successfully recruited from a wide variety of people in this age group, and word-of-mouth information about course options can spread quickly. In order to survive, the more limited noncollegiate vocational education programs will have to develop aggressive marketing networks to identify potential students in these age groups and to convince them of the benefits of their programs.

TABLE 3.3

POLICY IMPLICATIONS OF FUTURE CHANGES

High Technology

The 1980s may be a boom period for new technologies and have the effect of upgrading many occupations and requiring higher skills. The implementation of new technologies will create a myriad of opportunities for vocational education programming.

Loss of Traditional Students

Secondary school enrollments in vocational education will be dropping during the eighties, as will post-secondary enrollments of eighteen to twenty-four year-olds.

Rise In Importance of New Groups

New types of people will be seeking education, particularly older women. Two-year colleges are well suited to meet the needs of this population group. Colleges will need to develop new marketing strategies to attract these nontraditional students.

The Educationally Disadvantaged

A larger percentage of vocational education enrollment will be comprised of educationally disadvantaged students. Remedial basic skills courses will be needed, as will special programs for the needs of target groups (Hispanic, inner-city youth, and so forth).

Student Achievement

Declining student achievement results on standardized tests may have implications for curricula, instruction, and program goals. Schools serving older students, however, may find a much higher rate of achievement.

Culture Differences

More minority students from different backgrounds will be participating in vocational education. They will bring their own cultural expectations and perspectives. Administrative and faculty personnel of vocational education programs will need to reflect the increased diversity of the student population.

Financial Problems

Education budgets may not keep pace with overall growth rates of the Gross National Product. Two-year colleges may be the exception, as they expand into the adult market.

Strong Future Competitors

Two-year colleges should prosper since they have already proven themselves an especially attractive source of vocational/occupational education for those over age twenty-four. The armed forces will seek to recruit a larger portion of the shrinking youth cohort. They will be providing training to the enlisters. Business and industry is likely to provide much more training also.

Curriculum Developments

Curriculum changes will be needed to adjust for new technology, a changing student population, and more part-time students.

The Educationally Disadvantaged

Educationally disadvantaged groups will comprise a larger percentage of vocational education enrollment, especially in publicly sponsored programs (e.g., two-year colleges, publicly supported postsecondary noncollegiate schools, armed forces, and CETA). This development implies that complementary programs of remedial basic skills courses will be needed along with regular vocational/occupational skills courses. Special programs must be developed to reach specific groups—inner-city youth, and Spanish-speaking adults in rural counties, for example. Teacher training and curricula should reflect the changing needs of the students. Still, with skilled labor in relatively short supply (and inadequately prepared youth still in abundance), the societal returns of any effective vocational training of these disadvantaged youths should be very high.

Student Achievement

The trend toward lower achievement levels on standardized written tests for students entering vocational education will have serious consequences for curricula, teaching methods, and program goals over the longer term. However, since the decline in standardized test scores has been slight on a year-by-year basis, no dramatic changes can be expected. Further, if motivation has been a factor in the test score decline, it may be that the older adults who are coming back to school for training related to labor force reentry, or career changes, will be far more motivated than younger students. The schools serving more mature students may find much higher student achievement levels in their programs.

Cultural Differences

A larger share of minority students will participate at every level of vocational education. Each minority group—blacks, Asians, Hispanics—will bring its own cultural expectations and perspectives. Adjustments in faculties and administrative personnel will be needed to reflect the relative proportions of the clientele being served.

Financial Problems

Public support for vocational education increased rapidly during the 1970s. The same will probably not be true during the 1980s. The growing spirit of fiscal conservatism spawned by the high inflation rates of the 1970s will probably mean that education budgets will not keep pace with overall growth rates of GNP. The expanding population base among older adults may actually increase the resource base of two-year colleges and make them an exception among public programs that face serious budget squeezes. The crimp on public budgets should provide a substantial opportunity for the expansion of private-sector programs.

Strong Future Competitors

Two-year colleges have already proven themselves an especially attractive source of vocational/occupational education for anyone over age twenty-four, especially those seeking part-time training. As the number in this age group grows, two-year colleges should prosper.

To meet its personnel quotas, the armed forces must recruit a larger portion of the shrinking young adult group. Prime targets will be young adult males who have only a high school diploma.

There is a need to integrate the needs and objectives of the armed forces into any comprehensive long-term planning efforts in the field of vocational education.

Finally, businesses are likely to become even stronger forces in vocational/occupational training. Many more companies are likely to be offering their employees opportunities for retraining or upgrading skill levels—particularly as young labor market recruits become harder to find, as longer term employees show more dissatisfaction with their current jobs, and as sophisticated new technologies offer more efficient ways to accomplish certain tasks. A substantial increase of in-house training programs is expected, which will be in direct competition with other vocational education programs. Concurrently, an increase in tuition aid programs and many more business-vocational school joint enterprises is likely.

Curriculum Developments

Factors implying a need for curriculum adjustments include: new programs for changing technological needs; increased sensitivity to the changing age, sex, and ethnic composition of the vocational education population; more part-time participants; and more training designed for disadvantaged groups. The most important curriculum change may result from the growing cooperation between business and the vocational education establishment.

Alternative Futures Conference

The Alternative Futures for Vocational Education Conference was held on January 8 and 9, 1980. Participants included senior staff members of the National Center and individuals external to the National Center who were either policy makers in vocational education or persons in a position to influence policy. The purposes of the conference included—

1. sharing information regarding a number of activities which may influence the future of vocational education;
2. developing alternate views of the future of vocational education based upon participant expertise and the provided information; and
3. delineating policy issues of prime importance in the 1980s for vocational education.

The first activity of the conference was a presentation by Gregory Schmid of the Institute for the Future regarding its report on the future of vocational education.

The second activity of the conference was a panel presentation by three persons who direct activities likely to influence vocational education policy. The speakers were: Henry David, Director of the Vocational Education Study of the National Institute of Education (NIE); Dean Griffin, Director of Government Relations, American Vocational Association; and Michael O'Keefe, Assistant Secretary of Planning and Evaluation, Department of Health, Education and Welfare.

Dr. David explained the scope of work of NIE's Vocational Education Study. It is a congressionally mandated assessment of vocational education. Dr. O'Keefe discussed some of those policy questions which the federal government is expected to ask regarding vocational education. Mr. Griffin presented the overriding issue areas identified by the American Vocational Association.

On the second day, participants were divided into three groups and asked to consider alternative futures for vocational education. Each of the three groups assumed a different frame of reference in its discussions: optimistic, pessimistic, and realistic.

The participants in the 'optimistic' workshop felt that support and funding for vocational education will continue regardless of the economic conditions. Second, they thought that the problems and changes expected in American society in the 1980s (energy shortage, aging population) could benefit vocational education (need for trained workers in energy technologies and human services). The optimists agreed that vocational education would be more flexible and varied in the 1980s; instruction will be more individualized, entrance and exit into vocational programs will be easier, and cooperation among other vocational education providers will be greater.

The outlook was decidedly different in the 'pessimists' group. They assumed a severe economic downturn that would have a negative influence upon vocational education. A funding change from institution-based to individually-based financing (voucher system) was seen likely and, if it did occur, it would be harmful to vocational education. The targeting of federal vocational education funds exclusively for special needs populations was viewed as possible and as detrimental since it might stigmatize vocational education. The pessimists' general theme was that vocational education in its traditional form is a locally supported enterprise that serves a variety of clients. Changes that would move vocational education away from this condition were generally considered pessimistic.

The 'most likely' workshop participants foresaw a future for vocational education that would be essentially a confirmation of the present but which would include a modest decline in funds and a greater emphasis on special needs populations. In addition to the influences on vocational education delineated by the Institute for the Future, this group felt international and domestic policy would have an impact on the future of vocational education. They felt there will be more coordination with other deliverers of vocational training at the local level and that business and industry will play a more active role.

The last activity of the Alternative Futures Conference was the listing of policy issues for the eighties by each of the participants. The topics selected as policy issues included: data needs and evaluation, meeting federal priorities, cooperation among vocational deliverers, articulation between different levels of vocational education, special-needs groups, access to vocational education, funding of vocational education, special roles for vocational education, relationship between education and work, equity within vocational education programs and services, vocational education planning, readiness to change, and state governance of vocational education.

Summary

The activities of the first year of the futures project generated a substantial data base. The Delphi produced expert opinion on specific, possible events upcoming in vocational education. The Institute for the Future's report described likely external conditions that may shape vocational education. The conference provided feedback on work to date, new information on alternative scenarios, and input regarding perceived policy issues in the 1980s.

Very little actual integration of the data was achieved during this first year. However, several projections occurred with such frequency and in so many different contexts that they were viewed as important developments that are very likely to influence the nature of vocational education in the 1980s.

- The reduced number of young people, competing demands for public funds, and pressure to reduce government spending will probably lead to a decline in the proportion of the gross national product that education receives.
- The emphasis in federal vocational education legislation will continue to be on increasing equity, on providing services to groups with special needs, and on overcoming sex stereotyping.

- The extent of federal influence upon state and local activities in vocational education is likely to remain at about the present level.
- Vocational education will probably become a more varied enterprise in regard to the characteristics of its students, the kinds of services it provides, and the number and kinds of cooperative agreements it has with business, industry, and labor.
- Competency-based instruction will be increasingly used in vocational education.
- Because of the decline in births in the 1960s and 1970s, there will be fewer young people in the sixteen to twenty-four age range from which vocational education has traditionally drawn about three-fourths of its students.
- As a consequence of the reduced number of young people, there will be fewer new entrants into the labor force.
- The number of adults thirty-five and older in vocational education seems very likely to increase. This will likely lead to higher proportions of students at the postsecondary and adult levels.

CHAPTER 4

METHODOLOGY

The process used in the second year of the National Center's exploration of possible futures of vocational education involved several of the methodologies described in chapter 2. The work was based upon the progress made during the preceding project year (chapter 3). The steps were as follows:

1. Review data base developed in year one of the project (Delphi information, conference input, and Institute for the Future report). Determine the primary trends and developments and the main federal policy initiatives likely to influence vocational education during the 1980s.
2. Develop and conduct a cross-impact analysis to examine the important interactions among the trends, developments, and policy initiatives.
3. Generate a "standard 1990 world" scenario and two "alternative 1990 world" scenarios.

Each of these steps will be delineated in greater detail throughout the remainder of this chapter.

Review Data Base, Determine Primary Trends and Main Policy Initiatives

The first step in the process was to synthesize year one results and to draw conclusions from that synthesis. The data from the Delphi, the Institute for the Future report, and the conference were examined.

Conclusions collaborated by more than one source were considered to be most important. The conclusions reached were categorized in two ways: (1) an established trend likely to affect vocational education, or (2) an expected policy initiative within vocational education likely to be important in the 1980s.

An example of an established trend which will have an impact is that nationally the relative numbers of minorities and limited-English-speaking people in the younger age groups will be increasing. An example of a policy initiative likely to affect vocational education during the 1980s is that of the growing emphasis on the role of vocational education in state and local economic development.

Although year one information indicated that a number of trends and policy issues would affect the nature of vocational education, the possible interactions among the trends and policy initiatives were unknown. Cross-impact analysis was determined to be a useful tool to obtain information concerning these interactions.

Develop and Conduct a Cross-Impact Analysis

Cross-Impact Analysis was described briefly in chapter 2 as one of the methods which futurists use to make projections. There are several ways to design a cross-impact analysis. The National Center's cross-impact analysis was designed to achieve the specific goals of this study. It was a relatively simplistic approach in comparison to some cross-impact analyses, which involve computer iterations of all possible interactions among variables. The cross-impact analysis which was used provided a format for experts to estimate the impact of the occurrence of a given event upon another event or trend in both qualitative and quantitative terms.

Assessment of the impact of established trends upon the probable policy initiatives of the 1980s and the impact of a given policy initiative upon another policy initiative were considered to be the important outputs of the study.

The trends and developments which seem to be relatively established and likely to influence vocational education are as follows:

1. The relative number of young people between the ages of sixteen and twenty-four will drop sharply between 1977 and 1985.
2. There will be a rise in the proportion of the population in the thirty-five through forty-four and sixty-five plus age groups.
3. The relative number of minorities and limited-English-speaking people in the younger age groups will increase.
4. Growing fiscal conservatism in the nation will increase competition for public dollars.
5. Advancements in technology will continue, causing further need for a highly skilled work force.
6. There will be a growing emphasis on increasing the productivity of the American worker.
7. The proportion of federal to state and local dollars for vocational education will remain approximately one to ten.
8. Formal agreements of cooperation between many vocational education institutions, business, industry, labor, CETA, and other training providers will be formulated.

The policy initiatives expected to be emphasized in the 1980s are as follows:

1. Attending to the needs of special populations (disadvantaged, limited-English-speaking, handicapped)
2. Additional accountability requirements for the purposes of program improvement
3. The elimination of sex bias and stereotyping within programming and services
4. Preparation for employment with specific focus on unemployed youth
5. The role of vocational education in the promotion of state and local economic development
6. The role of vocational education in responding to the need for the conservation of energy

Instrumentation

The above trends and policy initiatives were based on work accomplished during year one of the futures project and were the factors used in the cross-impact analysis. The cross-impact analysis was conducted in two formats. One was a holistic format; in it all of the trends were summarized into a brief scenario. The participants were asked to consider the impact of the scenario upon each of the policy initiatives (Appendix A).

The second format involved analyzing the impact of each trend upon each policy initiative. In addition, the joint interaction of each policy initiative was determined. Participants were asked to describe the interactions in qualitative (narrative) and quantitative terms.

The qualitative aspects of the cross-impact analysis focused on responses by experts in the field to the request: Describe the effects of trend *x* upon policy initiative *y*. A similarly worded question was asked for all of the possible interactions. A total of seventy-eight cells were involved (eight trends plus six policy initiatives multiplied by six policy initiatives, less the six cells in which a policy would be having an impact upon itself); each respondent reacted to twenty cells.

The quantitative aspect of the cross-impact analysis involved having experts rate the impact of the trends and policy initiatives upon the policy initiatives. The interactions were framed in a matrix with trends and policy initiatives listed along the side of the page and the policy initiatives listed across the top of the page (Appendix B). The participants were asked to determine how the trends and policy initiatives were expected to influence the occurrence of the policy initiatives. They could choose from the following responses:

+2 Row item strongly enhances the probability of occurrence of the column item
+1 Row item moderately enhances the probability of occurrence of the column item
0 Row item has no impact upon the column item
-1 Row item moderately diminishes the probability of occurrence of the column item
-2 Row item strongly diminishes the probability of occurrence of the column item

Participation

Individuals who are national experts in vocational education policy or related areas were selected by National Center staff to be respondents to the cross-impact analysis. Participants were paid a fifty dollar honorarium. The original group of thirty-six persons was assigned to five subgroups. The first subgroup responded to the holistic format. The remaining four subgroups were asked to complete the format that sought to examine the interaction of trends and policy initiatives both quantitatively and qualitatively. However, a given person only had to complete one-fourth of the cells; therefore, each participant responded to approximately twenty cells.

Process

Both of the cross-impact formats were completed by mail. Consultants had approximately one month to complete the forms and return them to the National Center. No iterations were involved in this cross-impact analysis.

Synthesis of the Cross-Impact Analysis Data

Three types of data from the cross-impact analysis were examined:

1. The holistic format—qualitative judgments
2. The cell-by-cell matrix format
    A. qualitative judgments
    B. quantitative ratings

The primary findings from each of the three data sources had to be determined, and synthesized in order to use the data as input for the scenarios. The analysis process was subjective, since most of the data was collected via an open-ended narrative form.

The quantitative data from the matrix format provided numerical results. The frequency of quantitative ratings for each cell was tabulated. The results displayed the respondents' opinions of the impact one trend or policy would have upon the occurrence of another policy initiative. Those cells indicating a great deal of consensus of response or resulting in the more extreme ratings were considered most significant.

The qualitative matrix responses were listed point by point for each cell and then summarized according to policy initiative area. That is, the summary showed how each of the six policy initiatives was affected by all of the trends and other policies. Since this last summary paralleled the format of the holistic cross-impact, the results were combined.

The conclusions from the cross-impact analysis and data from the previous year were considered to be the primary determinants of the content of the scenarios. The cross-impact results are presented in chapter 5.

Scenario Development

The items determined important for inclusion within the scenario were:

- the impact of the eight trends and developments influencing vocational education upon the six policy initiatives;
- the impact of the policy initiatives upon each other;
- the impact of trends and policies upon vocational education programming areas (curriculum, teachers, support services, and so forth); and
- the impact of several unusual but possible events upon policy initiatives and programming.

In order to increase the usefulness for policy formulation, three scenarios were developed. The first was a "standard world scenario." It is a description of what vocational education most probably will look like in 1990 if projected trends continue and expected policy initiatives are implemented. No dramatic events, such as a global war, are included within this standard world scenario. Its purpose is to communicate a "surprise-free" view of vocational education. Specific considerations in the standard world scenario may or may not be accurate when reexamined in 1990; however, the overall scenario should be indicative of the types of potential problems and possible avenues of growth.

Along with the standard world scenario, two alternative scenarios were conceived to help display policy choices and consequences. The standard world scenario portrays vocational education in 1990 if no drastic shifts in policy occur. The two alternative scenarios portray vocational education in 1990 if specific shifts in policy are implemented during the 1980s. The variances between the standard world and two alternative scenarios, therefore, are due to choosing different policy directions for vocational education at the national level. The policy choices selected to serve as the base for the two alternative scenarios are possible results of the 1981 (or 1982) vocational education reauthorization legislation. Eight consultants met at the National Center to consider the resultant impact of the two alternative policy choices. This input was used to create the two alternative scenarios. The consultants' names are listed in Appendix C. All of the scenarios are presented in chapter 6.

CHAPTER 5

RESULTS OF THE CROSS-IMPACT ANALYSIS

The cross-impact analysis provided expert judgment on the interactions of future trends and the probable policy initiatives of the 1980s. As described in chapter 4, two cross-impact instrumentation formats were used—a holistic approach and a cell-by-cell matrix approach. Five individuals responded to the holistic format, and nineteen people each completed one-fourth of the total possible cell interactions of the cell-by-cell approach. In the final stages of data reduction, the results of the holistic and cell-by-cell approach were combined. As previously noted, the cross-impact results were both qualitative and quantitative. These results are presented in the following pages.

Qualitative Results

The results are a listing of the impact of all of the trends and policies upon each policy initiative. Listings 5.1-5.6 display the future effects upon the six policy areas.

Quantitative Results

The quantitative ratings were structured to permit participants to choose one of five response options. The response options represent the extent to which a trend or policy will affect the occurrence of another policy. The results of the ratings were formulated by calculating the frequency of responses for each cell. These frequencies are presented in table 5.1, Ratings of Probabilities of Occurrence.

The results indicate that for many cells there is a wide divergence of opinion on how one trend or policy will influence another policy. Consensus was achieved for only six of the seventy-eight cells: A-6, C-6, K-6, M-2, N-3, and N-5. The first three of these six cells concerned the impact of a trend or policy upon the role of vocational education in responding to the needs for conservation of energy. All respondents felt the named trend or policy would have no impact upon that role.

The cell that displayed the most variance in responses was D-1—the degree of influence of "growing fiscal conservatism in the nation will cause increased competition for public dollars" upon "attending to the needs of special populations (disadvantaged, limited-English-speaking, handicapped)". One person said the first item would strongly enhance the probability of occurrence of the second item, and another individual felt the first would strongly diminish the probability of the second. Other responses were either positive or negative, but no one felt there would be "no impact."

The quantitative data showed a more narrow view of how a trend might influence a policy than the qualitative data. The quantitative format specifically asked for how one item would affect the probability of occurrence of another item. The qualitative format was more open-ended and asked simply for the effects of one trend upon one policy.

LISTING 5.1

THE EFFECTS OF TRENDS AND POLICIES UPON SPECIAL NEEDS POPULATIONS

Planning

There will need to be changes in instructor preparation and improvements in curriculum to meet the needs of special populations.

It will be necessary to strengthen special programs and services.

The increased technical nature of jobs will pose additional problems for special populations. There will be a need to emphasize basic skills and realistic on-the-job training.

It will be necessary to work cooperatively with business and industry to provide realistic learning settings.

Implementation

There may be some competition for resources from older adults, who may themselves be members of special populations.

Emphases on worker productivity could lead to a turning away from special populations in favor of working with those more likely to succeed. If this does not happen, vocational education will have to address questions of changing student work attitudes and values, and increasing program flexibility to include allowing more time for special population students to attain competence.

Vocational educators may have to work more closely with employers in helping them to accept the limitations of special population workers, and in allowing for follow-up training.

Effective agreements with business and industry should enhance the chances that special population training needs will be better met. Some questions emerge, however, as to the extent to which training will enhance employment opportunities in times of high unemployment.

A federal initiative to eliminate sex bias and discrimination is seen as slightly diminishing vocational education's attendance to the needs of special populations. This is not due to any conflict or incompatibility of the initiatives; instead it is a matter of competition for scarce resources. It is felt, by some, that attending to the needs of special populations would also involve some elements for reducing sex bias, and that any efforts to do so would be mutually enhancing.

An involvement in state and local economic development should slightly enhance the amount of attention paid to special populations, especially as the number of new labor force entrants decreases.

Outcomes

An emphasis upon meeting the needs of the disadvantaged will continue.

All needs will probably not be met. Research and development can help identify the best ways to address those needs that vocational education can address.

Increased fiscal conservatism will hinder services to and programs for special populations. The better organized and more emotionally appealing groups will suffer less.

If federal funds do not increase, and the ratio of state/local to federal dollars remains the same, then attempts to meet the needs of special populations will be hampered. Federal resources will probably continue to be targeted to such groups.

Increased accountability requirements will result in increased attention to the needs of special populations.

Increased attention toward preparation for employment with a focus on unemployed youth is an effort which should also assist in meeting the needs of special populations.

LISTING 5.2

THE EFFECTS OF TRENDS AND POLICIES UPON ACCOUNTABILITY

Planning

The emphasis on productivity will stimulate vocational education to devote more attention to work attitude and value development. Vocational education will need feedback from business and industry to continually reassess and revise programs. Such concerns will moderately to strongly affect accountability requirements.

Although the necessity of cooperative arrangements in meeting diverse training needs is accepted, it is not known if such arrangements will contribute to the imposition of additional accountability requirements. Cooperative arrangements are seen as making accountability more complex.

Implementation

The presence of larger proportions of special needs individuals in younger age groups might lead to additional accountability requirements.

The efforts in elimination of sex bias and discrimination will not lead to additional accountability requirements to any appreciable degree. Rather, accountability will come naturally as authentic attempts are made to eliminate bias and discrimination. What is needed is to apply what is presently known about eliminating sex bias and to be accountable for seeing that it is carried out.

A focus on preparing unemployed youth for employment might lead to some additional accountability requirements. However, accountability is seen as requiring a real commitment of resources which are essential if the unemployed youth problem is to be addressed.

Vocational education's involvement in state and local economic development will entail an ability to demonstrate a new type of effectiveness. This implies a different type accountability.

Vocational education's involvement in the nation's economic development implies a commitment to the conservation of energy. Vocational education will be called upon to take an active role in energy conservation and must be able to demonstrate the manner in which it will do so.

Vocational education can be more accountable by developing "outreach" programs to better serve the hard-to-serve, and by being accountable for programs which affect the productivity of the nation's work force.

Outcomes

Although a decline in youth population is seen as having a limited influence on accountability requirements, program improvements based on meeting the needs of adults and special clients may have a more significant affect on accountability.

Accountability measures relative to meeting the education and employability needs of adults are foreseen. There may be increased accountability only if the absolute number of adults increases, as opposed to just the proportion.

Fiscal conservatism will force vocational education to improve programming and to be accountable for the services delivered. Ineffective or duplicative programs will be eliminated. If state/local monies continue to be the dominant sources of funding, then state requirements may increase, too.

Advancements in technology will force some program improvement, but their impact on accountability is seen as only moderate.

LISTING 5.3

THE EFFECTS OF TRENDS AND POLICIES UPON SEX STEREOTYPING

Planning

The increase in the relative proportion of minority group individuals in the younger age groups will likely lead vocational educators to deal with a new set of questions relative to eliminating sex bias and stereotyping.

The demand for increased productivity should enhance possibilities of eliminating sex bias and discrimination.

Dollars do not eliminate sex bias. The extent to which federal dollars provide leverage on states and local communities to address such concerns will determine the impact. Generally, the proportion of federal to state/local dollars will have little to do with the elimination of sex stereotyping and bias within programming and services.

Implementation

A relative drop in the number of young people between ages 16 and 24 will not affect the elimination of sex bias per se. It will affect elimination of sex bias, however, if fewer workers mean shortages of workers.

Formal cooperative agreements with other agencies, business and so forth may help to reduce sex bias. Unfortunately, business and industry do not have any better track record than vocational education for eliminating sex bias.

Any effect of attending to the needs of special populations on the elimination of sex bias will be minimal. The provision of special services to special populations could, however, enhance somewhat the elimination of sex stereotyping.

Preparation for employment with a specific focus on unemployed youth will have little impact upon the elimination of sex bias and stereotyping within programming and services. This is because some of those making up the unemployed youth segment also hold strong sex biases.

Vocational education should do all it can to eliminate sex bias. Unfortunately, there are forces outside of its control which encourage discrimination or, at least, retard the process of elimination. Congress will probably continue to push for renewed efforts to eliminate discrimination and it appears that over a long period the goal will be realized.

Outcomes

A rise in the proportion of the population in the 35-44 and 65+ age groups will encourage the elimination of sex bias as more older women demand access to training programs which might be termed nontraditional.

Growing fiscal conservatism will either leave unchanged or retard efforts aimed at eliminating sex stereotyping.

Technological advancements will probably result in jobs which will defy sex stereotyping. That, plus societal trends, and possible labor shortages in certain highly skilled fields, should contribute to a reduction in sex stereotyping.

As vocational education becomes involved in state and local economic development, as labor resources become increasingly scarce; and as business has to meet more stringent regulations, there will be a reduction of sex bias and stereotyping.

Vocational education's involvement in energy conservation will have no effect on the elimination of sex bias and stereotyping.

LISTING 5.4

THE EFFECTS OF TRENDS AND POLICIES UPON YOUTH UNEMPLOYMENT

Planning

Preparing minorities and limited-English-speaking people for employment speaks to the need for developing basic skills. Instructors will need inservice training to work with these client groups.

To help unemployed youth prepare for technical positions, better training and more cooperative-type programs are needed.

Additional accountability measures will not significantly enhance preparation for employment for unemployed youth; however, effectiveness must be monitored and providers will be held accountable for their products. Additional accountability requirements could assist in preparing unemployed youth for jobs if they led to better follow-up efforts.

Implementation

An increase in the relative number of minorities and disadvantaged in the youth population, should keep the focus on unemployed youth high. This could be moderated, however, by the demands and needs of increasing numbers of adults who may compete with the youth group for scarce jobs. A possible problem exists in serving both the needs of unemployed youth and unemployed adults.

If the expected downturn in the number of young adults entering the labor market occurs, the need to serve minorities and limited-English-speaking and prepare them for employment will become even more apparent.

Growing fiscal conservatism will probably make it more difficult to serve the needs of unemployed youth.

Attempts to increase productivity will demand that unemployed youth receive vocational training. In addition to occupational skill training, there will have to be increased emphasis on work habits and basic skill development.

Unless there is a great deal of state and/or local commitment to serving the needs of unemployed youth, stable or decreasing funding will adversely affect the extent to which this group is served. Additional funds may have to be sought from other sources.

If vocational education becomes involved in state and local economic development, it will need to concentrate on preparing unemployed youth for employment. Youth will also need to be taught to "sell" their capabilities to employers.

Vocational education will have to work cooperatively with other agencies and providers of vocational education in searching out and attracting unemployed youth to vocational programs. Much will need to be done to provide basic academic and employment skills.

Youth will need to be brought more into the mainstream as they are asked to bear an increasingly large burden of supporting an aging population. Perhaps some form of "national youth corps" will need to be established to provide an alternative to the traditional progression of school, work, and marriage.

Outcomes

Advancements in technology may pose particular problems for unemployed youth since they typically do not prepare for technical jobs.

As formal agreements of cooperation are formulated among vocational education providers, an emphasis upon preparation for employment with a specific focus on unemployed youth will be enhanced.

Attending to the needs of special populations will have a strong positive effect on preparing unemployed youth for employment since special populations are most likely to be unemployed. Attention to other age groups within the special population groups could detract somewhat from this effort.

The elimination of sex stereotyping will have little impact on preparing unemployed youth for work. Decreased numbers of young people and lessened sex stereotyping may open up some nontraditional jobs for unemployed youth.

Vocational education's role in the conservation of energy will probably have little effect on preparing unemployed youth for employment.

The 1980s will see an increase in subsidized youth job programs with much on-the-job training taking place. There will be a trend toward tying youth programs to other community-based and federally subsidized work programs.

LISTING 5.5

THE EFFECTS OF TRENDS AND POLICIES UPON ECONOMIC DEVELOPMENT

Planning

Additional accountability requirements are not seen as appreciably enhancing economic development unless states require economic development efforts of local vocational education providers. Additionally, program improvement is seen in terms of efficiency, whereas economic development is viewed in terms of program planning—offering appropriate training at appropriate times and places and to the extent necessary.

Vocational education will need to identify industries in which America possesses a competitive edge, plan curricula in concert with economic development officers, and provide job relevant education.

Vocational education will have to improve the match between courses offered and job openings available. Closer cooperation and collaboration with economic development officials should improve this match.

Vocational education will need to be responsive to a changing employment system and will have to be in a position to react quickly to economic and other needs.

There is some speculation that vocational education will have to seek greater involvement in job creation, assist in the process of technological change in industry, and assist local industries in dealing with new cost-effective approaches.

Implementation

More effort will be expended in training existing workers and other adults. Programs that fail to prepare their youth constituents adequately will be glaringly obvious.

In order to promote economic development, vocational education must become more flexible in meeting the education and training needs of older workers. Retraining, updating, and upgrading will become important vocational education activities, and more service will be delivered at the place of employment. This implies closer ties to business and industry.

Since there is evidence to suggest that high technology industries locate in an area partially as a function of the availability of trained workers, vocational education has an obvious role to play in economic development. Another implication concerns vocational education's working cooperatively with other actors regarding economic development.

An emphasis on increasing the productivity of the American worker should greatly enhance the role of vocational education in the promotion of state and local economic development. More postsecondary training and retraining, ongoing adult programs, and flexible short-term courses taught by part-time instructors from business, industry, and labor will be needed.

Attending to the needs of special populations will enhance economic development in that it will help prepare individuals for employment and it will help maintain a stable workforce. Vocational education can be an advocate for special populations and assist in the promotion of economic development.

If vocational education can prepare currently unemployed youth for employment, economic development will be enhanced. To the extent which that is done, vocational education's image will be improved. To prepare youth for employment, vocational education will need to work cooperatively with industry in identifying where jobs are or will be, and what relevant training needs will exist.

As vocational education responds to the need for conserving energy, it may contribute to the promotion of state and local economic development. This will occur through training workers in new energy jobs and technologies, planning for the number of workers needed in new fields, eliminating programs that do not contribute to economic development, and increasing human capital through increased job relevant education.

Outcomes

Growing fiscal conservatism will force vocational education to demonstrate that it can promote state and local development and that it is effective in doing so.

If the proportion of federal to state and local dollars remains the same, the extent to which vocational education assumes a role in the promotion of state and local economic development will vary only slightly. Perhaps, as competition for funds becomes more keen, vocational education will seek to work closer with other agencies for the purpose of economic development.

Although vocational education will probably not eliminate sex stereotyping and bias entirely from its programs, the extent to which it does will enhance economic development. This is especially true if jobs remain unfilled that could be filled by a person of nontraditional sex. Promotion of the idea of ability and talent as criteria for training versus sex will also promote economic development.

LISTING 5.6

THE EFFECTS OF TRENDS AND POLICIES UPON CONSERVATION OF ENERGY

Planning

Advancements in technology may affect the conservation of energy and such advances should be reflected in the types of training programs available. Vocational education should be active in the research, technical assistance, consumer education, and energy technology education needed in this field.

Vocational education will need to expand technical training opportunities relative to energy occupations and conservation. In order to know the types of programs to provide, vocational education is going to have to seek out means and ways to participate in energy conservation at the state and local levels, and must provide leadership in this area.

Implementation

It will be difficult for secondary vocational education to reach older age groups with regard to energy education. This means that vocational education must work with public information people and place effective conservation instructional units at postsecondary institutions.

If formal agreements dealing with energy conservation are formulated between vocational education institutions and other training providers, they will enhance the role vocational education can play in responding to the need for conservation of energy. As industry wants assistance with energy-related concerns, cooperative agreements will be stimulated. Generally, formal agreements should enhance the role vocational education plays in responding to the need for conservation of energy.

Conservation of energy should be an integral part of vocational education programs, and little is to be gained by additional accountability requirements unless they are focused upon energy conservation. In addition, as vocational education finds itself increasingly dependent upon state and local funds, it must be accountable to those interests and their energy conservation concerns.

There is not a great relation between preparing unemployed youth for employment and the need for conservation of energy, except for training unemployed youth in energy occupations. Unemployed youth will need to be taught understandings and relationships between what skills are needed to produce energy and why energy should be conserved.

Outcomes

A drop in the number of young people (ages 16-24) will have little impact upon vocational education's role in responding to energy conservation needs. What impact there might be is in terms of sharing facilities, competing with more traditional programs for students, and a feeling that the skill level of energy occupations will lend itself to training at the postsecondary level.

Vocational education is seen as having a role in energy conservation, and the trend of fiscal conservatism is seen as having a positive impact on vocational education's initiative to respond to energy conservation. Exactly what the overall impact of fiscal conservatism will be is unclear, although the following occurrences are speculated: dollars will go into programs with low expenditures per pupil—if energy education is relatively inexpensive, it will be retained.

If vocational education is to address energy-related concerns, more dollars are required. Current proportions of federal to state and local dollars are seen as inadequate for vocational education to respond to the need for conservation of energy.

The elimination of sex bias and stereotyping was not seen as having any impact on the role of vocational education in responding to the need for conservation of energy.

If energy conservation becomes an occupational growth area, vocational education's involvement in state and local economic development would include offering training in energy-related areas. Generally speaking, little or no impact was seen with regard to vocational education's promoting economic development upon responding to the need for conservation of energy.

TABLE 5.1

RATINGS OF PROBABILITIES OF OCCURRENCE
CROSS-IMPACT – PART II

Directions

On the next two pages are the quantitative results of the cross-impact analysis. Participants were asked to provide estimates of the degree of influence of selected row items (trends and policy initiatives) upon the occurrence of selected column items (policy initiatives) according to the following rating scale.

+2 – row item strongly enhances the probability of occurrence of the column item

+1 – row item moderately enhances the probability of occurrence of the column item

0 – row item has no impact upon the column item

-1 – row item moderately diminishes the probability of occurrence of the column item

-2 – row item strongly diminishes the probability of occurrence of the column item

Each participant was asked to estimate the impact of trends and/or policy initiatives upon policy initiatives in twenty cells of the matrix. No single participant was asked to respond to all seventy-eight cells of the matrix.

TABLE 5.1

RATINGS OF PROBABILITIES OF OCCURRENCE

N = either 4 or 5 per cell

f = frequency of response per rating

	1. Attending to the needs of special populations (disadvantaged, limited English-speaking, handicapped)		2. Additional accountability requirements for the purposes of program improvement		3. The elimination of sex bias and stereotyping within programming and services		4. Preparation for employment, with a specific focus on unemployed youth		5. The role of vocational education in the promotion of state and local economic development		6. The role of vocational education in responding to the need for conservation of energy	
	rating	*f*	*rating*	*f*	*rating*	*f*	*rating*	*f*	*rating*	*f*	*rating*	*f*
A. The relative number of young people between the ages of 16 and 24 will drop sharply between 1977 and 1985.	2	2	2	2	1	4	1	4	2	2	0	4
	1	1	1	1	-2	1	-1	1	1	2		
	0	2	0	1					-1	1		
B. There will be a rise in the proportion of the population in the 35-44 and 65+ age groups.	1	3	2	2	2	2	1	2	2	2	2	1
	-1	1	0	3	1	1	-1	1	1	2	1	3
					0	1	-2	1			0	1
C. The relative number of minorities and limited-English-speaking people in the younger age groups will be increasing.	2	2	2	2	1	1	2	2	2	3	0	4
	1	1	1	1	0	1	1	1	1	2		
	0	1	0	1	-1	2	-1	2				
			-1	1	-2	1						
D. Growing fiscal conservatism in the nation will cause increased competition for public dollars.	2	1	2	3	0	2	1	1	2	1	2	2
	1	1	1	1	-1	2	-1	2	1	3	1	2
	-1	2					-2	1			0	1
	-2	1										
E. Advancements in technology will continue, causing further need for a highly skilled work force.	2	3	2	1	2	2	2	2	2	3	2	1
	-1	1	1	3	1	3	1	1	1	2	1	3
	-2	1					-1	2				
F. There will be a growing emphasis on increasing the productivity of the American worker.	1	3	2	2	2	2	,2	2	2	3	2	1
	-1	1	1	3	1	1	1	1	1	1	1	2
					0	1	-1	1			0	2
G. The proportion of federal to state and local dollars for vocational education will remain approximately one out of ten.	-1	2	2	1	1	1	2	1	1	1	0	2
	-2	1	1	1	0	2	1	1	0	3	-2	2
			0	2	-1	2	-1	3	-2	1		
			-1	1								

Table 5.1 (continued)

N = either 4 or 5 per cell

f = frequency of response per rating

	1. Attending to the needs of special populations (disadvantaged, limited-English-speaking, handicapped)		2. Additional accountability requirements for the purposes of program improvement		3. The elimination of sex bias and stereotyping within programming and services		4. Preparation for employment, with specific focus on unemployed youth		5. The role of vocational education in the promotion of state and local economic development		6. The role of vocational education in responding to the need for conservation of energy	
	rating	*f*	*rating*	*f*	*rating*	*f*	*rating*	*f*	*rating*	*f*	*rating*	*f*
H. Formal agreements of cooperation will be formulated between many vocational education institutions, business, industry, labor, CETA, and training providers.	2	3	1	3	1	4	2	2	2	1	2	3
	1	2	-1	1			1	2	1	2	1	1
									0	1	0	1
I. Attending to the needs of special populations (disadvantaged, limited English-speaking, handicapped).			2	1	2	1	2	4	2	1	2	1
			1	3	1	2	1	1	1	3	1	1
					0	2			0	1	0	3
J. Additional accountability requirements for the purposes of program improvement.	2	1			2	1	2	1	1	2	2	1
	1	2			1	3	1	3	0	2	1	2
	-1	1									0	1
											-1	1
K. The elimination of sex bias and stereotyping within programming and services.	1	1	2	1			2	1	2	2	0	4
	-1	2	1	1			1	2	1	2		
	-2	1	0	2			0	1	0	1		
			-1	1			-1	1				
L. Preparation for employment, with a specific focus on unemployed youth.	2	3	2	1	1	1			2	1	2	1
	1	2	1	3	0	2			1	2	1	2
					-1	1			-1	1	0	1
											-1	1
M. The role of vocational education in the promotion of state and local economic development.	2	2	1	4	2	2	2	2			1	3
	1	1			1	3	1	2			0	1
	0	1					-1	1				
	-1	1										
N. The role of vocational education in responding to the need for conservation of energy.	0	3	2	2	0	4	1	2	1	4		
	-1	1	0	2			0	1				
			-1	1			-1	1				

CHAPTER 6

SCENARIOS

Items examined in previous chapters included societal, demographic, and economic trends and probable federal policy initiatives that can be expected to affect vocational education in the coming decade. Alone, the data are interesting but not extremely helpful for vocational education policy makers. The scenarios that are presented in this chapter are the result of attempts to synthesize the data into an explicit, meaningful format.

Scenarios, as a technique, allow the reader to consider interactions of trends (e.g., maturing work force) and policy initiatives (e.g., energy conservation), and their implications for vocational education, which might not otherwise be considered.

Three scenarios are presented in chapter 6. The standard world scenario is a plausible representation of what vocational education might look like in 1990. The standard world scenario was developed by National Center staff and by a review panel of experts. Again, the standard world view is not intended to predict what vocational education will look like at the end of the decade, but it does represent a future that is possible based on current trends and federal emphases.

The first alternative scenario and second alternative scenario might accurately be titled standard world II and standard world III. They differ from the standard world scenario in that a new federal policy initiative is introduced into the standard world view. The change introduced into the first alternative scenario is an emphasis toward on-site training and away from institutional training by the federal government. The second alternative scenario reflects a greater proportion of federal funds being directed toward providing short-term and adult training programs.

The two alternatives were generated by a panel of experts who considered the changes in the standard world that would result from introducing the new policy initiatives. Although similarities among the three scenarios far exceed differences, the standard world version was considered to be the most probable vocational education future.

The standard world and alternative scenarios employ the same organizing framework. The future of vocational education is discussed within the context of federal policy initiatives perceived as being driving forces behind vocational education. The standard world scenario appears first. It is followed by the first alternative scenario, which introduces one new federal policy initiative into the standard world and discusses its effect on the standard world. The second alternative scenario with its new federal policy initiative is presented last.

The three scenarios, presented here as "think pieces" rather than as prediction devices, reflect the implications of following certain courses of action. Possible negative as well as the more ideal positive consequences of policy initiatives are incorporated into the scenario narratives. Considering both the negative and the positive consequences of future events is essential to the formulation of realistic strategies that might either support desired outcomes or circumvent the less desirable ones.

By encouraging thought about the problems facing vocational education, and by stimulation and exploration of possible solutions, the scenarios contribute to a view of the future as events that may be shaped and directed, rather than passively awaited and endured.

The 1980s were anything but a peaceful decade as the nation experienced major political, social, and economic changes. Ours was a society in transition. The sixties and early seventies, which were characterized by excessive consumption of nonrenewable energy and other natural resources, easy consumer credit, and steady economic growth, gave way to a decade in which the economy fluctuated, productivity slumped, and America tried to shake its dependency on foreign oil. Individuals witnessed rises in fuel costs and watched inflationary pressures erode their purchasing power.

Economic conditions were especially difficult for retired persons and those approaching retirement age. As it became more difficult to exist on fixed incomes, and as medical breakthroughs allowed individuals to look forward to a longer productive life, the trend toward early retirement was arrested. Many individuals who were about to retire actively pursued other work options. Sometimes these were in the form of part-time supplemental employment in the same or a similar occupation, but often they involved retraining in another occupational field. As a result of these trends and the pressure to maintain the "good life," the labor force participation rate for all persons over age sixty-five rose from 11 percent to almost 30 percent during the ten-year period.

Women continued to enter the work force in increasing numbers. Partly in response to family need for two incomes, and partially as a result of the trend toward more single heads of household, the labor force participation rates for women climbed steadily. By 1990, 55 percent of all women over the age of sixteen were working, with this figure expected to climb.

The demographic changes experienced during the 1980s were dramatic, with the dominant feature being the maturing of the population cohort born during the "baby boom" (1945-1963). At the same time, however, the drop in birthrate of the 1960s and 1970s was being felt. Because of fewer numbers of school-age youth, secondary education enrollments dropped by almost 13 percent between 1977 and 1990. Although the total number of young people decreased compared to previous decades, the proportion of young people defined as minorities (black and other races—mostly Asian) increased. Allowing for Hispanics, and including the approximately ten million illegal aliens residing in the country, the minority population comprised 26 percent of the total U.S. population by 1990. Indeed, in some areas of the country, minority populations were assuming majority proportions. Of the population in the job entry level age group (sixteen to twenty-four years old), minorities comprised 30 percent of the total.

During the ten years between 1980 and 1990, the labor force grew from 108 million to 124.6 million workers. By the late 1980s, however, the annual rate of labor force growth slowed to one-half of the rate of the previous two decades, owing to fewer new labor force entrants in the traditional sixteen to twenty-four year old range. Increased labor force participation rates for women moderated the effects of this trend. In another development the relative abundance of older, more experienced workers led to keen competition for middle-level, nontechnical positions. There was an increase in permanent part-time workers, as workers from two-income households opted to remove themselves from the competitive cycle. Greater competition for management positions stimulated mid-life career changes among workers between the ages of thirty and fifty.

While official figures indicated that the labor force stood at 124.6 million in 1990, these figures failed to account for undocumented foreign workers. Some estimates suggested that as many as 3 million undocumented foreign workers were working in the United States. These workers tended to

have low skill levels, relatively poor educational backgrounds, and a propensity to change occupations more rapidly than the average American worker. Undocumented foreign workers displaced American workers in many unskilled occupations, flooded the labor market of the Southwest, and enlarged the concentration of hard-to-train-and-employ workers in the large cities of the Northeast.

Continuing a trend first witnessed in the late 1970s, government expenditures (as a percentage of GNP) steadily declined. From a peak of 35 percent in 1975, total government expenditures fell to 30 percent in 1990. This mood of fiscal conservatism did not leave the educational system of the nation unaffected. Funding constraints prevented school districts from raising teacher salaries to offset inflation, and from upgrading their educational programs. Consequently, teacher militancy and labor strife were high during the 1980s.

Educational trends during the decade fell into two broad categories: changed enrollment patterns and measured achievement. While there was a decrease in the traditional school-age population, more adults participated in education. Minority individuals also came to represent a greater portion of the elementary, high school, and college student population. A disturbing trend was that school achievement, as reflected by standardized test scores, continued to decline, but at a slower rate than during previous years. Although the decline in average student achievement on standardized tests had leveled off by 1985, the discrepancy between student scores in the first and last quartile had actually widened. Decreasing public confidence in the schools was taking place at this time, also.

Federal policy initiatives and funding were continuing stimuli for change in vocational education. The major federal policies initiated during the 1970s continued into the eighties: attending to the needs of special populations, accountability requirements for program improvement, elimination of sex bias and stereotyping within programming and services, preparation for employment with a specific focus on unemployed youth, the promotion of state and local economic development, and the conservation of energy. The broad concerns of programming also received attention. Under this category were such components as facilities and equipment, administration and finances, curriculum, and teacher training/retraining. The changes occurring in each of these areas during the 1980s are discussed in further detail.

Attending to the Needs of Special Populations

The federal government maintained its emphasis on needs of special populations during the 1980s by specifying that a portion of its funds be directed toward these groups. Handicapped and disadvantaged individuals, American Indians, displaced homemakers, and students with limited ability to speak English received particular attention from vocational educators. Minority and Hispanic enrollment rates in vocational programs increased dramatically during the decade. While reading and computation test scores declined among the general population during this time, the decline in scores among minorities and the discrepancy between scores of the majority and minority populations became more pronounced.

Vocational educators were faced with increased numbers of students who possessed inadequate basic education and work skills, and a lack of knowledge of good work habits. With educationally disadvantaged groups comprising a larger percentage of vocational education enrollments, especially in publicly sponsored programs, more remedial basic skills courses were offered along with the regular vocational skill courses. Much of the emphasis in providing services to special population members was on building basic academic skills and work habits desired by industry. Many of the more progressive institutions used the occupational training component of their programs as a vehicle for basic academic skill development. The more successful programs, particularly those

within postsecondary institutions, developed extensive outreach programs to locate and "sell" the benefits of vocational education to special populations. Programs were then developed for specific groups, e.g., inner-city youth, and Spanish-speaking adults in rural counties. Community and technical college enrollments expanded as these institutions assumed many adult special population training functions.

While an emphasis on meeting the needs of special populations was strong generally, it was not always consistent across groups. The national mood of fiscal conservatism, which was evident in the early 1980s, forced groups to compete for resources. While well-organized and vocal groups, such as the advocates for the physically handicapped, maintained their portion of resources and level of services, other subpopulations who lacked strong advocacy groups, such as the mentally ill, lost ground. When economic conditions worsened, as they did periodically during the decade, the American public demonstrated a hesitancy to divert resources to what was perceived to be a relatively small number of individuals.

By 1990, strides had been made toward meeting the needs of special populations, but much remained to be done. Educators still lacked adequate resources to apply the most effective and appropriate teaching strategies in working with the special groups; furthermore, even after successfully completing a vocational program, many individuals were unable to find unsubsidized employment.

Perhaps the most encouraging development during the decade was the increased cooperation which materialized between vocational education, business, industry, labor, and other public agencies. Stimulated in part by reduced financial resources and in part by recognition that special populations members have a variety of special needs (e.g., counseling, occupational education, basic skill development, and child care) that cannot be met by a single agency or enterprise, cooperative ventures proliferated. As the nation began to feel the effects of fewer new labor force entrants and labor shortages ensued, business and industry took a more active role in providing training opportunities for disadvantaged and minority youth.

Cooperative arrangements between vocational education and other public agencies prospered where the needs of special populations were understood and economic incentives to cooperate existed. Although breakthroughs in the amount of cooperation between vocational education, business, industry, labor, and other agencies were sometimes dramatic, a lack of adequate incentives to cooperate often created problems. In fact, cooperative ventures were much more successful in other areas, such as the involvement of vocational education in state and local economic development and energy conservation.

Part of the problem experienced by vocational education in meeting the needs of special groups had to do with the lack of a clearly articulated national policy toward ethnic and cultural minorities. The debate on bilingual education still concerned whether the nation should pursue a policy of cultural assimilation or a policy of cultural pluralism which included maintaining ethnic and cultural diversity by conducting instruction in languages other than English. By the end of the decade it appeared that those favoring cultural pluralism had strengthened their positions as some areas of the country, particularly the Southwest, no longer had a clear cultural majority. Intense competition for resources hampered efforts to adequately address the needs of special populations.

Accountability Requirements for Program Improvement

The decade of the seventies was known as the "Age of Regulation." The election of a Republican president in 1980 who campaigned on the promise of reduced government interference in the private economic sector reflected, to some degree, dissatisfaction with what had come to be viewed as over-

regulation. This promise was fulfilled by a low incidence of new regulations during his term. While few new accountability requirements were enacted, vocational education was kept busy implementing and complying with regulations already in existence. Vocational education came to be evaluated on the appropriateness of its programs, as well as on its ability to prepare individuals for existing jobs.

While vocational education had always been held accountable for placing program completers in jobs relevant to their area of training, accountability assumed greater importance during the eighties. Vocational education programs were required to reflect a high degree of awareness of the local job market. Program completers were expected to be competent and to find employment in their field of preparation. While placement rates were used as one criterion of program effectiveness, they were not the sole criterion. In the late seventies, vocational educators had advocated moving to a broader evaluation base, which included assessing the actual skills and competencies acquired.

Programs were scrutinized for the degree to which services provided to special populations resulted in their finding employment. As federal dollars were increasingly specified for special groups, vocational educators struggled to continue serving the general population with fewer dollars. Vocational educators who were asked to work with subpopulations that typically required more services and were hard to employ, expressed dissatisfaction with the emphasis on job placement as the typical measure of program effectiveness. Even with these seemingly insurmountable problems, vocational education slowly demonstrated an increased responsiveness to the needs of special populations.

Generally, the eighties were characterized as a decade high in accountability but with few additional accountability requirements. Accountability was mainly achieved through tying federal funding to specific measurable criteria established at the national level. This specifying of funding was to ensure that special populations received attention, and that vocational education cooperated with state and local agencies in fostering economic development. In addition, declining resource levels led to tighter accountability at the state and local level. Vocational programs were forced to demonstrate their effectiveness in order to continue to receive funding.

The need to prove effectiveness created severe problems. Conflicts arose over whether funds should be used for program improvement or for required planning, evaluation, and reporting activities. Vocational educators asked themselves how aggressively they wanted to court special populations when they knew that typically it was difficult to achieve high placement rates with such groups. At the secondary level, school administrators struggled with the problem of distinguishing between individuals enrolled in programs for avocational or exploratory reasons and those preparing for employment.

Where vocational educators were able to expand their services to meet the needs of special populations, improve access, and incorporate supply and demand data, they tended to meet accountability requirements. This was certainly no easy task, and progress was slow and painful.

Elimination of Sex Bias and Stereotyping Within Programs and Services

Continued progress was made in the 1980s toward the elimination of sex bias and stereotyping within programs and services. The federal government maintained its emphasis in this area, but throughout the decade responsibility for the elimination of sex bias moved to the state and local levels. By 1990, most vocational programs were available to any interested individual, regardless of that person's sex, and enrollment patterns had changed. While all programs did not enroll males and females in equal numbers, sex stereotyping was not the primary reason for the discrepancy.

There was an influx of males into health and business and office occupations where many males, desiring technical and clerical jobs that did not require extensive periods of education, sought training and employment. This influx led to many jobs in those fields being upgraded and career paths being established. As early as 1980, it could be observed that some occupational fields, such as word processing and many of the newer occupations, were taking deliberate pains not be to identified as appropriate for only one sex.

Nevertheless, progress came and continues to come slowly. The fact that vocational education enrollees came increasingly from populations whose orientation tended to include strongly ingrained models of appropriate sex role behavior raised a new series of questions for vocational educators.

Two factors contributing to the reduction of sex bias and stereotyping in programs and services were labor shortages that occurred in some occupations and areas of the country, and the increased number of women who sought occupational training. By 1990, as a matter of family economics, it was accepted that women would work outside the home.

By the end of the decade, much of the emotionalism surrounding the issue of sex bias and stereotyping within programs and services was gone. Many students, when asked, could not remember a time when members of both sexes were not enrolled in occupational training programs. As the number of traditional school-age students declined, institutions became more aggressive in their efforts to recruit students. Federal legislation which guaranteed the rights of women and minorities encouraged recruitment of nontraditional students. Legislation also prompted vocational education to expand the support services offered to students to help ease the transition into nontraditional training programs and occupations. The effect of efforts to eradicate sexism in the society at large was also felt during the decade and stimulated nontraditional enrollments. Progress was slow, however, and the movement was dealt two blows. The conservative shift in the national outlook during the early 1980s slowed the process slightly; second, increased competition for middle management positions among older workers led to a backlash against women who held or sought management positions.

Preparation for Employment with a Focus on Unemployed Youth

Large numbers of unemployed youth, especially in major urban areas, continued to plague the nation during the 1980s. Although new labor force entrants (sixteen to twenty-four years of age) actually declined during this period, the proportion of those who had special learning needs and were hard to employ grew. At the beginning of the decade people hoped that as the labor force grew smaller in size, employment and training opportunities would grow for those segments of the population who typically bore the brunt of unemployment. High rates of inflation, which kept many individuals in the labor force beyond retirement age and made two-income families an economic necessity, served to dampen the expectation that youth unemployment would be successfully resolved. In addition, most of the changed occupations that emerged during the decade were highly technical in nature. These were the very occupations in which minority group members, with traditionally high rates of unemployment, tended to be underrepresented.

Vocational educators faced severe difficulties in addressing the issue of youth employment. In response, they developed massive outreach programs, especially in urban areas and rural areas of high unemployment. Many of the federal dollars for vocational education were earmarked for urban areas with high rates of youth unemployment. Programs were designed with a heavy basic education skills component; subsidized youth job programs emphasized the work and classroom components. Efforts to place youth in on-the-job training programs increased. The greatest successes came in those

occupations and areas of the country where labor shortages developed; in these cases, business, industry, labor, and education worked cooperatively to help business and industry understand how to deal with unemployed youth.

Vocational educators implemented competency-based programs that allowed individuals to move at their own pace through programs. While competency-based programming served students well, it was not a panacea. For example, members of special populations who possessed weak basic skills tended to remain in programs longer than traditional students. As they became frustrated with their lack of progress and the amount of time they had to spend in training, many still dropped out. Even those who successfully completed a program were not assured of finding employment.

In addition, the conservative fiscal mood of the nation meant that the level of resources necessary to provide appropriate services was not always available. Even if the resources had been available, few vocational educators were specialists in working with disadvantaged populations and able to develop the outreach programs so critical to the success of any attempt to alleviate youth employment. Many vocational educators doubted their ability to successfully address the problem independent of the external forces shaping the nation.

Role of Vocational Education in the Promotion of State and Local Economic Development

Vocational education emerged as a major actor in the revitalization of the American economy. Increasingly, availability of federal funds was contingent upon vocational education's ability to demonstrate cooperation and involvement in state and local economic planning. Vocational education became much more aggressive in seeking representation on economic development councils and many new linkages were forged in this area. As vocational education became a more active partner in enticing new business and industry into areas by providing trained human resource pools, its image was enhanced. This led to greater contact with business and industry as vocational education was perceived as being responsive to their needs. Many states contracted with local vocational education programs to assure potential new employers that trained workers would be available for given occupations in a specific geographic area.

Vocational education placed a major emphasis during the decade on working with business, industry, labor, and other organizations by providing personnel and facilities for educational programs for employed individuals. This emphasis was strengthened when Congress enacted new legislation making special tax credits available to pay for the continuing education of employees at the work site. Postsecondary institutions were quick to seize this opportunity to broaden their client base. By the late 1980s, postsecondary institutions had established a strong presence in providing retraining of short duration. Much of the training was delivered at the worksite.

As cries for increased worker productivity mounted, vocational education programs were forced to become more job-relevant. They demonstrated an improved match with job openings and employment requirements. The desire to improve productivity also led business and industry to cooperate with vocational education in providing relevant training on modern equipment. Again, postsecondary institutions seized the initiative in establishing these arrangements. They became adept at responding quickly to training needs by providing appropriate programs.

Throughout the decade, America attempted to increase productivity and retain advantages in industries where it held a competitive edge. States and localities attracted new businesses and employment opportunities to their area by promoting the notion that a well-trained work force contributed

to increased productivity. These developments presented opportunities for special population members. Special training efforts were aimed at disadvantaged minority and limited-English-speaking individuals. The increased technical nature of many new or changing occupations also fostered awareness of the need to prepare these individuals for employment. This proved to be extremely difficult, as many special group members possessed poor basic academic skills and lacked awareness of the appropriate work habits needed to succeed in occupational training programs. Another problem faced by these individuals was that business and industry remained reactive in their training approaches. Where shortages existed within an industry (e.g., microprocessing) or a geographic region (e.g., the Southwest), industry worked closely with vocational educators to provide on-the-job training or work experiences. Where an immediate need to cooperate was not felt, cooperative arrangements suffered.

Role of Vocational Education in Responding to the Need for Conservation of Energy

Concern for energy dominated the eighties. At a basic level, vocational education did what it had done well in the past, which was to provide occupational training for existing jobs. As energy policies emerged to guide the nation in meeting its energy needs, new jobs were created. Vocational education responded with training programs. Sometimes they were highly technical in nature, involving new equipment and competencies; but often, existing programs were upgraded to reflect the new emphases of energy-related occupations.

Community and technical colleges developed programs to reach and teach older adults about energy conservation measures. Many secondary institutions taught energy conservation and provided on-the-job training to unemployed youth in home weatherization projects. By 1990, almost 25 percent of course content in vocational programs consisted of instruction related to energy conservation techniques.

Industry stimulated vocational education to play an active role in the conservation of energy. As the cost of energy increased, business and industry became much more conscious of their energy consumption and sought to maximize the economic return on energy use. Pressure was brought to bear on vocational education to inculcate, as a work value, the conservation of energy. As a result, vocational educators introduced energy conservation concepts into all instructional programs. More frequently, students were initiated into the "how to's" and "why's" of energy conservation. This trend of emphasizing energy conservation as a work value was not unlike developments that were economically motivated. For example, the country had already witnessed a movement toward occupational health and safety. Although legislation compelled business and industry to make the work place more clean and safe, it soon became apparent that there were also economic advantages to be gained from compliance, e.g., reduced workers' compensation claims and lawsuits. The concept of preventive health care had as its major impetus rapidly escalating health care costs. Economic forces also accelerated the energy conservation movement.

Vocational education devoted considerable time and effort to defining skill requirements of new and changing energy occupations. As diverse energy sources became economically feasible, much of the training for occupations in those fields became highly specialized, with vocational education assuming a major training function.

Programming

Facilities and Equipment. By the late 1970s, the replacement and maintenance of equipment had become critical problems. Too few dollars were available to keep equipment operable, much less to purchase new equipment used by changing technologies. By the mid-1980s, this problem had reached crisis proportions. At the secondary level, programs were maintained to the extent possible until the equipment wore out and then the programs were frequently eliminated. The programs that remained were those that did not require expensive equipment. While many traditional trade and industry programs were phased out, distributive education and other relatively inexpensive course offerings burgeoned. More vocational education programs were offered at regional or area vocational schools to save money.

Similar problems plagued postsecondary institutions. Since they had taken the lead in providing training for new and changing technologies, they were particularly hard hit by rapid equipment obsolescence and the reduction in resources available for public enterprises. Although costs were defrayed somewhat by rising enrollments, two-year colleges were pressed to supply expensive equipment required in teaching highly technical courses.

Although the picture was grim at times, events prompted vocational educators, especially at the postsecondary level, to seek alternative ways to deliver services. One that held considerable promise was training more students on the job. Various incentives offered to employers encouraged them to make their sophisticated equipment and machinery available for training purposes.

Administration/Finances. During the 1960s and 1970s, state vocational education administrators provided leadership for local vocational educators. State supervisors, representing the traditional service areas, visited schools and districts, worked with teachers in developing new or modifying old curricula, and generally provided a host of technical assistance services. Within local vocational programs there was also a large administrative component, e.g., program supervisors and local directors.

By 1990, the face of vocational education administration had changed significantly. As a result of fewer funds being available for state vocational education administration, the number of state staff remained frozen at 1980 levels. Concurrently, state administrators labored to meet federal requirements. As planning, reporting, and evaluation requirements grew, subject matter specialists gave way to vocational education personnel who could operate in multiple roles. A similar phenomenon occurred at the local level as supervisory positions were eliminated and administrative staff levels were pared.

One outcome of the decreased availability of funds was that most states increasingly tied funding to local vocational education program accountability. This encouraged the elimination of programs that were not effective in preparing individuals for employment. As funds became tight, some groups felt that they were being shortchanged and continued to pressure the federal government to play a more prescriptive role in the use of federal funds.

The group least affected by the financial problems which faced public institutions was the two-year colleges. An expanding population base among older adults and the aggressive recruitment of nontraditional students by community and technical colleges meant increased enrollments. Colleges also capitalized on their contracts with business and industry to provide in-house training. Shrinking public budgets also stimulated an expansion of private sector training programs.

Curriculum/Teacher Training. Vocational education curricula moved in three major directions during the decade. First, where finances and cooperative arrangements permitted, curricula reflected new and changing occupations, e.g., microprocessing technology and energy. Entrepreneurship preparation flourished too; and by 1990, 50 percent of the postsecondary vocational and technical institutions had such offerings. Second, 25 percent of the states enacted minimum competency requirements in vocational education. Finally, curricula increasingly reflected attempts to meet the needs of different client groups, oftentimes by changing the manner in which services were delivered. More emphasis was placed on learning theory, as curriculum developers sought to incorporate the most effective techniques for teaching educationally disadvantaged individuals and older adults. Many programs moved to a flexible, short-term, open-entry/exit format in order to train and retrain CETA-type clients and people from industry. More job training and retraining was conducted by two-year postsecondary institutions at the work site. The trend by two- and four-year postsecondary institutions to award credit for life experience expanded.

As curriculum became more specialized and individualized, and as the nature of vocational education clients changed, increased demands were placed on teachers and teacher training institutions. Teachers were asked to be sensitive to the needs and learning styles of nontraditional students, while maintaining their own proficiency in technical fields where technology was rapidly changing. Staff preservice and inservice training was offered in these high need areas. Teacher institutions became more field-based, with educators frequently visiting schools and work sites to work with teachers (especially those recruited from industry) and work-site supervisors. More teacher contracts called for periodic paid leaves of absence to upgrade skills. In many highly sophisticated technologies, business and industry designated workers to be trained as instructors, and assigned them to vocational-technical institutions on a rotating basis. Other innovative attempts at improving teacher proficiency included job rotation back to business and industry and a modified cooperative-education program, where vocational-technical instructors taught for nine months and returned to the work place for three months.

While the training and retraining of vocational teachers was a critical issue during the eighties, so too was the preparation of individuals to provide support services for nontraditional students. Technological developments, such as typewriters with auditory feedback, and word-processing equipment that was activated by voice, expanded the training opportunities for many physically and educationally handicapped individuals. These individuals also had special counseling and placement needs. Increased numbers of women entering training programs created a need for special support services. Teacher training institutions were thus challenged to prepare professionals with the specialized skills and knowledge necessary to effectively assist nontraditional students.

Conclusion

While the 1980s were often difficult times as America struggled to establish energy independence, wrestled with declining productivity, and moved to accommodate population shifts, it was also a decade of opportunity. Institutions developed new approaches for looking at old problems. Many new and innovative techniques were applied in the areas of education and training. Where vocational education adapted to the changing context in which services were required and delivered, it remained a viable educational enterprise.

Assumptions Surrounding a First Alternative Scenario

Rising equipment costs presented a major problem for vocational educators during the early 1980s. By 1981, the cost of maintaining existing equipment, much less purchasing equipment for new technologies, was prohibitive. At the same time, accountability requirements for job placement were strictly enforced. Meeting the needs of special populations, and assisting in state and local economic development, were major thrusts for vocational education. Budgetary constraints, accountability requirements, recognition that adults tended to prefer learning activities that were conducted at the work site, and a growing awareness that educationally and economically disadvantaged individuals learned best in a realistic work setting, led to a movement away from institutional training.

More training came to be delivered at the work site, often in conjunction with community-based organizations. Experience-based career education programs had demonstrated that although the per student cost was high, the concept worked; thus cooperative education and new approaches for delivering on-site training proliferated. Although educational institutions retained important functions, such as basic skill development, and served as a major learning resource, many students received all or a major portion of their instruction at the work site. For the first time, adequate economic incentives in the form of tax credits were available to encourage business and industry to participate in and cooperate with education. Business was therefore able to help ensure that future employees received appropriate training on modern equipment.

Attending to the Needs of Special Populations

A movement toward more on-site training did not appreciably benefit the economically and educationally disadvantaged. Those individuals, located predominantly in central cities, found that an eroded industrial base offered few on-the-job training opportunities. Transportation costs to outlying or suburban areas where on-site facilities existed prevented many economically disadvantaged students from participating in training opportunities. Transportation problems were even greater for handicapped individuals, and in rural areas, transportation and lack of training opportunities presented difficulties.

With more programs conducted on-site, certain disadvantaged groups did not receive the support services that they needed. Limited-English-speaking individuals particularly suffered from a shortage of bilingual instructors.

In order to deliver more training at the work site, federal and state legislatures had to amend insurance and safety laws. Adequate incentives then had to be offered to encourage them to accept special needs populations at the work site. Even with these developments the incentives were not sufficient for smaller firms which tended not to participate.

Accountability Requirements

An increase in on-site vocational training forced a reassessment of accountability requirements. Vocational educators resisted attempts to hold them accountable for students when industry often placed them in unskilled jobs that required little or no training; students were trained to do only a specific part of a total job; and skills taught were industry specific, thus less transferable. The influx of unemployed youth into on-the-job training programs led to a revision of assessment standards and procedures. Students were assessed before and after enrolling in programs as an element of evaluating program success. Placement rates ceased to be the most important evaluative criterion, especially as they applied to special populations.

Elimination of Sex Bias

Vocational educators had made progress in eliminating sex bias and stereotyping from vocational programs. With the shift to on-site training, a new emphasis was created to assist private sector personnel to maintain the progress achieved in fair hiring practices. The overall effort was supported by increased pressure on employers to respond to equal opportunity and affirmative action legislation and societal attitudes.

Initially, young, nontraditional students encountered difficulty in coping with the stresses of entering training programs for jobs typically held by the opposite sex. However, more displaced homemakers were attracted to nontraditional occupations and as support services were provided to nontraditional students at the work site, enrollments in short-term training programs reflected a more equal distribution of males and females.

Preparation for Employment with a Specific Focus on Unemployed Youth

The movement toward more on-site training was expected to increase job placement rates. Debate during the 1980s centered on whether the neglect of basic skill development was an appropriate "trade-off" for higher placement rates and lower youth unemployment. The targeted jobs tax credit programs of the 1980s successfully stimulated private sector employers to provide on-the-job training and cooperative education programs. On-site training tended to enhance work habits and attitude formation, which resulted in higher placement rates and provided a more responsive environment for dropout-prone youth. Detractors, however, claimed that the long-range effects were less positive because of a decreased emphasis on basic skills. They cited examples where academically disadvantaged youth could not meet the minimal skill requirements of industry for entry into training programs. They expressed concern with the lack of socialization skills and academic education that students received, and they questioned whether enough training sties could be found to meet career objectives for all students.

Many secondary institutions adopted on-site training as a bridge between general vocational education, which concentrated on developing basic vocational skills and work habits, and job placement. Such an approach ensured that support services were provided in the institutional setting and helped solve the transportation problems inherent in a total shift to on-site training, yet allowed for specific skill training on modern equipment.

State and Local Economic Development

Increased delivery of training at the work site did little to attract new business. Unless industry was already in place there was a lack of work sites for training new workers. Business also had to overcome the mentality of "training for the competition," i.e., other industries who employed the same workers. In growth industries, on-site training encouraged expansion and there was little doubt that on-site training facilitated retraining.

Substantial monetary incentives were required to elicit the help of business and industry in providing cooperative education sites for students. States and localities reaped benefits, however, as the wages paid to students and other on-the-job trainees often served as an economic stimulus. Student exemptions to provisions of the minimum wage law made this option even more attractive to business. Generally, these cooperative ventures worked best where there was labor market demand, when organized labor did not actively lobby against it, and where incentives for business and industry to participate existed.

Conservation of Energy

Because vocational education programs were primarily delivered at the work site, students were made sensitive to the attempts of industry to conserve energy. Some of this awareness was carried into the home and helped inculcate the value of energy conservation.

On-site training proved to be particularly effective for preparing workers for "cutting edge," energy-related technologies that required task-specific training on sophisticated equipment. As energy-related industries employed a greater proportion of workers, on-site preparation enabled vocational educators to keep pace with the demand for skilled workers in those occupations.

By delivering more on-site training, more energy was consumed in transportation; but less was consumed by operating institutional training facilities and equipment. Some businesses made extensive use of videotape recordings and closed-circuit television in their on-site training to further reduce energy and personnel costs.

Programming

In some highly industrialized areas where on-the-job training was accessible, schools needed to purchase less equipment. The on-site focus had its limitations, however. Transportation to the work site was frequently a problem, especially in areas where the training sites were far removed from clients. Businesses expressed much concern over insurance for student-workers and liability issues. The on-site training focus best served the emerging technological trades, even though the appropriateness of training for specific equipment caused debate. Another concern was that industry considered only certain job positions as appropriate for training vocational students, thereby limiting on-site training options.

On-site training was most successful when industry turned over major responsibility for retraining to vocational education agencies, where a spirit of cooperation existed between the training agency and industry, and when programs were tailored for specific labor needs. To achieve these conditions, vocational education personnel had to develop coordination and entrepreneurial skills and had to be able to work with diverse types of trainers and trainees. Teacher training institutions took a more active role in working not only with institutional teachers but also with industrial personnel, in preparing them to work with special populations. Institutional trainers also had to develop the capacity to evaluate the potential of training sites to meet the needs of diverse client groups.

Conclusion

By 1990, most general vocational education was carried out in an institutional setting. As students neared the completion of programs and became ready for placement, they received specific training in a business or industrial setting. Vocational educators were actively involved on-site in articulating the transition from general vocational education to employment. Such was the emergent vocational education model.

Assumptions Surrounding A Second Alternative Scenario

Immediately upon assuming office, President Reagan turned his attention to revitalizing the American economy. Many of the regulatory agencies that had been active in previous administrations had their authority curtailed as the new administration sought to reduce government interference in the private sector and to stimulate economic recovery.

Presidential advisors examined federal initiatives that would increase productivity and reduce the high unemployment rates that still plagued the nation. As the American work force was getting older, it became apparent that the nation faced two critical tasks: making skill-specific retraining available for unemployed workers (especially in the short run), and providing short-term programs for incumbent workers to upgrade skills. Similar programs existed for CETA clients. Many post-secondary institutions had already entered into contracts with business and industry to provide short-term, on-site job training and skill upgrading.

The federal government was convinced that vocational education could play a significant role in facilitating the adoption of new technologies at the work place and in increasing worker productivity. The 1981 reauthorization of the vocational education legislation directed a greater proportion of federal funds toward providing short-term and adult training programs.

Second Alternative Scenario

Attending to the Needs of Special Populations

Because of demographic changes, the existing work force, as well as large numbers of the unemployed, included greater numbers of special populations. The movement toward short-term training served them well, in that much of the training was delivered at the work place. Since training was skill specific, it led to employment opportunities sooner than if individuals had attended traditional programs. Adults in the special populations particulary benefited from the new emphasis. Displaced homemakers who found themselves in sudden need were able to receive specific training and thus generate income faster. The immediate payoff of the federal emphasis was to increase employment and to dampen the rate of increase in transfer payments to members of special populations.

The movement toward short-term training had some drawbacks. The increase in high technology and information processing occupations placed educationally deficient individuals at a competitive disadvantage, as employers and trainers sought individuals who could be expected to succeed in the training programs. The emphasis on short-term training led to a deemphasis of basic academic skill training that was critical to the employability of special populations. Finally, in order to effectively conduct short-term skill training for special populations, jobs were broken down into their simplest components. Training certain types of individuals only for these relatively simple tasks led to a new kind of occupational stereotyping and limited the job and upward mobility of special populations.

Accountability Requirements

The movement toward short-term and adult training programs created some pressure for new accountability requirements, but the general conservative tone of the nation and the involvement of new actors from business and industry tended to mitigate that pressure.

The nation experienced a movement away from the traditional accountability accorded vocational training as more vocational education was delivered at the work site. Instead of new accountability measures, accountability via a form of contract funding was advocated. Vocational programs were financed through training contracts rather than through automatic allocations. Successful performance dictated whether or not repeat contracts were awarded. Evaluations of institutional performance were based upon whether or not trainees obtained jobs; however, a conflicting movement in vocational education advocated evaluating programs on a "value added" basis, i.e., the degree to which enrollees increased their job skills and income.

Throughout the decade, policymakers struggled to resolve the accountability issue. Administrators wanted it streamlined to eliminate redundancy and the burdensome recordkeeping that characterized the late seventies. The nature of accountability changed as federal resources became more scarce, as closer ties were established between short-term training and state/local economic development, and as business and industrial personnel were increasingly brought into the training picture. Business and industry resisted the imposition of any new measures. States initiated evaluation efforts to assess factors related to: (1) student success in completing programs, (2) student success in obtaining employment, and (3) improving cost effectiveness of programs. A lack of funds necessitated using general evaluation procedures. Ultimately, two types of accountability systems appeared: a federally administrated "headcount" placement system, and a state administered evaluation oriented toward improving programs.

The Elimination of Sex Bias and Stereotyping Within Programming and Services

The shifting of federal funds toward providing adult and short-term training programs had little direct effect on the elimination of sex bias and stereotyping within programming and services. In spite of affirmative action and equal employment laws, the attitude of some industrial personnel bordered on resentment toward upwardly aspiring women, especially during the economic and employment downturns experienced throughout the decade. Business and industry leaders were faced with the prospect of having to recruit women into their work force, and to provide supportive services such as child-care facilities, while contending with the changing attitudes toward the role of women in the work force.

The biggest gains for women were in new occupations that had not been sex stereotyped and in industries or regions where labor shortages existed. While short-term training programs afforded women the opportunity to be trained quickly to enter the labor force, such a movement was not a major contributor to the reduction of sex stereotyping and bias.

Preparation for Employment with a Specific Focus on Unemployed Youth

Accountability demands suggested that training institutions could no longer afford to train students, only to "drop" them into a job market where they might not find employment. Successful training enterprises sought arrangements with business to train youth for specific job opportunities, involved counselors in assessing the needs of youth and in developing training plans, and intensified their placement efforts. Unfortunately, the emphasis on adult and short-term programs had an adverse effect on preparing youth for employment. Short-term training programs tended to ignore the basic educational skill development that youth desperately needed. In many instances, it became apparent that basic skill training was required before the short-term training could begin. There was a trend to direct short-term training programs toward adult subpopulations, such as retired workers and displaced homemakers.

Where adequate incentives to cooperate existed, or when there were not too many competing demands for their services, industry acted to provide on-the-job training experiences for youth that reflected occupational opportunities. Many dropouts and potential dropouts sought these types of nontraditional programs, but encountered difficulties because of their lack of basic skills and appropriate work values. Those that completed programs successfully often found that specific skill training left them unprepared for job obsolescence, and they were faced with the need for retraining.

State and Local Economic Development

Short-term training proved to be an excellent vehicle for addressing economic development needs. As the nation experienced a rebirth of its cities, and as industry moved into central cities, vocational education provided immediate, short-term training programs to meet human resource needs. Sometimes training programs were used to prepare potential workers before a firm located in a geographic area. A trained work force thus served to entice industry to relocate or expand into depressed areas. A trained work force, however, was only one factor that influenced the decisions of business and industry to relocate. They looked beyond training capability at a host of other variables, e.g., labor pool, tax incentives, and availability of utilities, before deciding to relocate.

Community colleges and technical institutes demonstrated an ability to gear up to meet short-term training needs and pioneered contractual agreements with new and changing industries. Much of the training conducted by these institutions was for the purpose of retraining or upgrading the skills of current employees and was conducted at the work site.

In general, vocational educators became more adept at participating in economic development planning, developing occupational skills as required by industry, and promoting the economic climate of their state. Such efforts enhanced the image of vocational education and ensured continued state and federal supports.

Conservation of Energy

As energy-related problems intensified, short-term programs seemed to be most effective in upgrading workers who already possessed skills that, with modification, could be applied to specific energy-related occupations. Short-term training, however, often conflicted with the development of values and attitudes of energy conservation. High energy costs for transportation encouraged localized training and placement programs. A disturbing development was that as a result of there being less time available for training, individuals trained for occupations arising out of new energy-related technologies were perceived as not being well prepared.

Programming

Attempts to revitalize the American economy led to funds being made available for new equipment. A significant part of those funds was earmarked for capital investment in depressed areas. Institutions received equipment monies when they could demonstrate that their trainees would contribute to industrial revitalization if they were adequately prepared.

Since even a major emphasis on buying new equipment could not meet the equipment needs of all vocational institutions and programs, novel arrangements and cooperative ventures continued to appear. Much of the training, for instance, was delivered on-site, reducing the funds required for facilities and equipment. Equipment was leased whenever possible, or where labor shortages existed, loaned to schools by business. In some areas of the country, businesses, machine manufacturers, and schools formed consortia. They established central locations where contemporary equipment and machinery were placed for short-term training.

The movement toward short-term training programs stimulated training on a contractual basis, often with business personnel and educators serving jointly as the training agents. The high cost of equipment and facilities encouraged the sharing of laboratories on a scale never before witnessed. With the federal emphasis on short-term training, and with fewer funds available for administration and supervision, vocational educators were forced to use industry planning councils extensively to plan and administer programs. Vocational education sought the administrative expertise of industry in helping to administer complex programs.

Vocational education administrators at all levels adopted new roles and functions. Most found themselves operating as entrepreneurs in identifying new training markets, "selling" training packages, and securing private sector training contracts and monies. They also had to attend to placing short-term program completers in jobs and to improving the effectiveness of traditional programs. Accountability came to be perceived in a more realistic manner, based on a "plan-implement-evaluate-plan" cycle.

The emphasis on short-term programs meant that basic skills and attitude development were often ignored in favor of specific saleable skill training. Since technology continued to change rapidly, more trainers were imported from industry, with many being temporarily assigned training duties by business itself. Those individuals who were employed full-time by training institutions needed to update their skills frequently. Instructors often received intensive training in a specific area immediately before assuming responsibilities in that area.

Curricula tended to be very specific in nature. More curricula were competency-based and individualized, packaged and marketed to meet specific labor needs. There was a movement away from degree or diploma programs, and toward the awarding of certificates of achievement, especially in highly technical skill programs.

Conclusion

More adult and short-term training led to increased adult involvement in vocational education. Such an approach tended to serve the skill upgrading and job retraining needs of business and industry. By 1990 vocational educators had become fairly adept at assessing training needs and designing and implementing appropriate programs. While some notable successes were achieved, vocational education was sometimes criticized for ignoring basic skill development and for allowing students to be trained in narrow occupational specialties.

APPENDIX A

Holistic Cross-Impact Format

HOLISTIC CROSS IMPACT

Please read the description below of how vocational education may be affected in the 1980s by various trends and happenings.

A LOOK AT VOCATIONAL EDUCATION IN THE 1980s

The world of vocational education in the 1980s will not be drastically different from that of the 1970s. However, there are some significant changes that are expected to occur. Due to the drop in the birth rate in the 1960s and 70s there will be fewer numbers of young persons and enrollment in secondary vocational education will decline by approximately thirteen percent. Another effect of the changing demographics will be the rising proportion of young people who come from economically disadvantaged or limited English speaking backgrounds. These young people will need and demand preparation and jobs in order that they may join the economic mainstream of American society. The impact of the women's liberation movement, which changed the face of the labor force as the 1970s progressed, will cause many adult women to be seeking vocational education during the 1980s. Other adults and older persons who are making career changes will also require additional vocational training.

But factors besides population shifts will cause vocational education to become a different entity than it was ten years ago. Education in general will receive proportionately less of the Gross National Product. Although the actual number of dollars allocated by the federal and state governments to vocational education may not decline, inflation and increasing expenditures for energy and defense will effectively reduce the vocational education budget. However, the proportion of federal to state and local dollars for vocational education will remain approximately 1 to 10. Education will become a declining industry.

The energy crisis will continue to grow in seriousness. Alternate energy resources and energy conservation will become the most critical issues of the decade and a resolution will not be foreseeable. Technological developments and advancements will continue at a pace which is remarkable. Many of the breakthroughs will require a highly skilled work force to implement the technology in a manner that the quality of life for the common man and woman can be improved. Productivity rates of American industries will become increasingly less competitive in the world market, and combined with American workers' demands for larger incomes (to keep pace with inflation), the prices of American goods and services will be driven ever higher. Vocational education will need to respond to these changes in the society it serves. One way it will be responsive is through the formulation of many cooperative agreements and arrangements with business, industry, labor, CETA, and other vocational providers.

Considering the above description, please comment on each of the attached pages on the influence of these trends upon the following policy areas:

1. Attending to the needs of special populations (disadvantaged, limited English speaking, handicapped).
2. Additional accountability requirements for the purposes of program improvement.
3. The elimination of sexual bias and stereotyping within programming and services.
4. Preparation for employment, with a specific focus on unemployed youth.
5. The role of vocational education in the promotion of state and local economic development.
6. The role of vocational education in responding to the need for conservation of energy.

APPENDIX B

Cross-Impact Quantitative Matrix

TABLE 5.1

RATINGS OF PROBABILITIES OF OCCURRENCE

N = either 4 or 5 per cell

f = frequency of response per rating

A. The relative number of young people between the ages of 16 and 24 will drop sharply between 1977 and 1985.

B. There will be a rise in the proportion of the population in the 35-44 and 65+ age groups.

C. The relative number of minorities and limited-English-speaking people in the younger age groups will be increasing.

D. Growing fiscal conservatism in the nation will cause increased competition for public dollars.

E. Advancements in technology will continue, causing further need for a highly skilled work force.

F. There will be a growing emphasis on increasing the productivity of the American worker.

G. The proportion of federal to state and local dollars for vocational education will remain approximately one out of ten.

1. Attending to the needs of special populations (disadvantaged, limited English-speaking, handicapped)		2. Additional accountability requirements for the purposes of program improvement		3. The elimination of sex bias and stereotyping within programming and services		4. Preparation for employment, with a specific focus on unemployed youth		5. The role of vocational education in the promotion of state and local economic development		6. The role of vocational education in responding to the need for conservation of energy	
rating	*f*	*rating*	*f*	*rating*	*f*	*rating*	*f*	*rating*	*f*	*rating*	*f*

Table 5.1 (continued)

N = either 4 or 5 per cell

f = frequency of response per rating

	1. Attending to the needs of special populations (disadvantaged, limited-English-speaking, handicapped)		2. Additional accountability requirements for the purposes of program improvement		3. The elimination of sex bias and stereotyping within programming and services		4. Preparation for employment, with specific focus on unemployed youth		5. The role of vocational education in the promotion of state and local economic development		6. The role of vocational education in responding to the need for conservation of energy	
	rating	*f*	*rating*	*f*	*rating*	*f*	*rating*	*f*	*rating*	*f*	*rating*	*f*
H. Formal agreements of cooperation will be formulated between many vocational education institutions, business, industry, labor, CETA, and training providers.	2	3	1	3	1	4	2	2	2	1	2	3
	1	2	-1	1			1	2	1	2	1	1
									0	1	0	1
I. Attending to the needs of special populations (disadvantaged, limited English-speaking, handicapped).			2	1	2	1	2	4	2	1	2	1
			1	3	1	2	1	1	1	3	1	1
					0	2			0	1	0	3
J. Additional accountability requirements for the purposes of program improvement.	2	1			2	1	2	1	1	2	2	1
	1	2			1	3	1	3	0	2	1	2
	-1	1									0	1
											-1	1
K. The elimination of sex bias and stereotyping within programming and services.	1	1	2	1			2	1	2	2	0	4
	-1	2	1	1			1	2	1	2		
	-2	1	0	2			0	1	0	1		
			-1	1			-1	1				
L. Preparation for employment, with a specific focus on unemployed youth.	2	3	2	1	1	1			2	1	2	1
	1	2	1	3	0	2			1	2	1	2
					-1	1			-1	1	0	1
											-1	1
M. The role of vocational education in the promotion of state and local economic development.	2	2	1	4	2	2	2	2			1	3
	1	1			1	3	1	2			0	1
	0	1					-1	1				
	-1	1										
N. The role of vocational education in responding to the need for conservation of energy.	0	3	2	2	0	4	1	2	1	4		
	-1	1	0	2			0	1				
			-1	1			-1	1				

APPENDIX C

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APPENDIX D

Cross-Impact

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